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STANFORD UNIVERSITY HOSPITAL

On behalf of the staff of Stanford University Hospital, I wish you a comfortable stay here. Please let me know, through Jeanne Kennedy, director of community relations, extension 7-7167, of anything we can do to make your hospitalization easier for you and your family.

Sheldon S. King
Executive Vice-President
and Director

OVER VIEW

Stanford University Hospital Overview

During a hospital stay, patients get a thorough look at their own rooms, perhaps their own units. If ambulatory, they may explore the entire corridor and test their legs by a walk to the sunroom. But most patients do not get a broad, overall view of the hospital.

This newsletter is designed to tell you about a few aspects of Stanford University Hospital for which it is particularly well known and of which we are particularly proud.

Overview is published by the Office of Community Relations, Stanford University Hospital, Jeanne Kennedy, director. Address inquiries and requests for additional copies to that office, Room P3018, Stanford University Hospital, Stanford California 94305. ■

A Specialized Caring Facility: The Compromised Host Unit

One group of patients who come to Stanford Hospital for treatment now have the benefit of a small, specialized unit, staffed and equipped for their particular and serious medical needs. Known as the "compromised host" unit, six rooms at the end of East 1A and 1B have been renovated for patients whose immune systems are severely compromised, making them highly susceptible to infection. Most are adults with acute myeloid leukemia, who spend three or four weeks in the Hospital in isolation.

The need for such a facility was first recognized by Dr. Stanley L. Schrier, chief of the Division of Hematology, who led the planning effort with Dr. Peter Greenberg, a faculty associate, for several years. They were assisted and abetted by nurses who recognized the difficulties in caring for these patients in other hospital settings: Nancy Madsen, former associate director of nursing; Judy Lanigan, assistant director; and Anna Olsen, who is now the clinical nursing coordinator of the unit.

Renovation began more than a year ago, and the unit has been receiving patients since February. Dr. Lee Levitt, assistant professor of medicine/hematology, has been named medical director; Dr. Robert Stebbins, a community physician on the voluntary/clinical faculty, is associate director.

Rooms are equipped with filtering systems, an air pressure system that directs air away from the patients, and an anteroom to permit handwashing by anyone who enters the patient's room. A new conference room and open nursing station is being built. When that construction is completed, the present solarium will be refurbished as a comfortable area for family members, many of whom come from a distance and all of whom are encouraged to stay close by. Because of the nature of the patients' illness, all the members of the care team are anxious to provide a "nourishing and favorable environment for patients and their families," as Dr. Schrier phrased it when the unit officially opened.

Funds for that portion of the renovation were provided by a bequest to the Hospital from Frank Fish Walker, as a means of memorializing his first wife. When the work is completed, a plaque will be hung in the solarium with the inscription: "A gift of Frank Fish Walker in memory of Ursula C. Walker." Mr. Walker was a community leader and a former trustee of the University.

There are only a few compromised host units in the country, Dr. Levitt says; more typically, cancer patients are grouped together in the oncology wing. For several months, he and Dr. Stebbins have worked with Hospital departments and services to systematize the best possible medical and nursing care for the unit. Their efforts are aimed at prevention

and treatment of infection and bleeding and include such concerns as infection prevention (or prophylaxis), nursing procedures, blood product support, nutritional requirements, and housekeeping standards. A specialized training program is being developed for nurses and housestaff on the unit.

The establishment of this procedural base, in addition to guaranteeing the best of patient services, develops a model for establishing a bone marrow transplantation service at Stanford. Dr. Levitt, who has been here for about one year, has served in several transplantation centers including the Fred Hutchinson Cancer Center in Seattle, which has the widest experience in marrow transplantation in the country. His research and clinical interest are in the study of normal and abnormal *hematopoiesis* (the formation and development of blood cells) and in the application of marrow transplantation to the treatment of a variety of hematological and nonhematological disorders. ■

Medical Center Tours

A general tour of the Medical Center is available to patients' families and visitors, as well as the general public, through the Office of Public Events. Tours are given regularly on Thursdays at 1:30 p.m. Reservations are required, and no children under 16 are permitted. For reservations or further information, call 497-6389. ■

Clair Mailhot
Director, Operating Room Services

What does a surgical patient remember about the operating room? Not much. Being parked on a gurney outside the room, drowsy from the first touch of anesthesia? The distant sound of voices? An impression of bright lights?

However difficult they are to recall, the 16 operating rooms of the Stanford University Hospital are probably this hospital's busiest, most bustling location, as they are in any modern, high-technology, teaching hospital. Consider only one element of the logistics: the turn-around time of an operating room from one scheduled procedure to the next. Thirty minutes is considered an acceptable length of time. Sometimes, at Stanford Hospital, all of this must occur in twenty minutes because of the heavy schedule: laundry removal; scrubbing down tables, floors, walls; equipment changes; preparation, instrumentation, and supplies for the next procedure.

Claire B. Mailhot, RN, MS, the new director of Operating Room Services, cannot praise too highly the nurses, aides, and assistants that make this kind of turnaround possible. "Superbeings, at the very least."

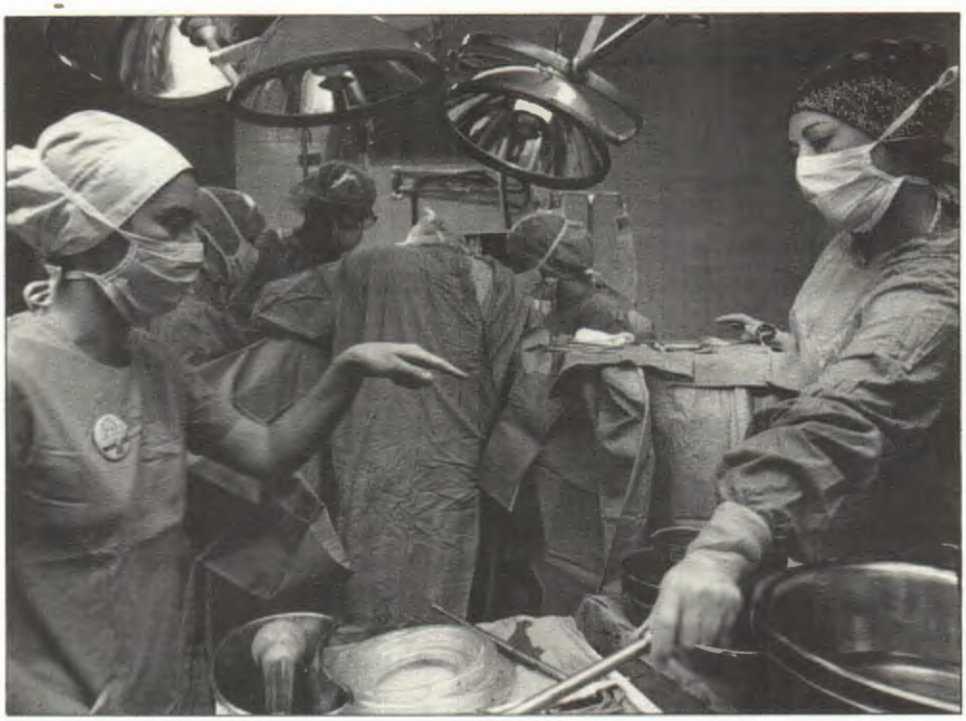
Ms Mailhot is responsible for managing the operating rooms, the post-anesthesia recovery room (PAR), and the Ambulatory Surgery Department. Most of her problems, she prefers to call them "challenges," stem from the Hospital's outgrown surgical suites, a problem that will be solved within four years by the proposed construction of new operating rooms.

For the time being, however, routine surgery is scheduled between 7 a.m. and 7 p.m. on week days, frequently on weekends, and the staff must continue to make the present facility work, knowing that some scheduled patients will be switched from their appointed time because of emergencies. "The length of some of our procedures adds to the scheduling pressure," Mailhot says. "Some take as long as ten to twelve hours."

About 13,500 surgical procedures are performed annually at Stanford. The major focus is on cardiovascular, general, and orthopedic surgery.

Ambulatory surgery, for which Mailhot is also responsible, is the wave of the future, she believes, because it holds down costs to the patient. Stanford ambulatory patients are admitted, prepared for surgery, and discharged through the Department. If they receive general anesthesia, they go to the recovery room before discharge. Biopsies, fistular repairs (for dialysis patients), and minor gynecological procedures are typical of the surgical problems treated in the Department.

Post-anesthesia recovery is a well-equipped, airy room built in 1976. It is a difficult and important nursing area because patients are in critical condition when they are wheeled there from the operating room. A nurse is assigned to each patient to monitor all the vital systems. She is an active colleague with the patient's physician, whom she alerts instantly at the sign of an emergency. Minimum time in the recovery room is one hour; some patients remain for six or seven hours—even overnight, depending on their need



for close observation.

Given that 450 doctors use the operating rooms—and that they differ in techniques even for the same procedures—the nurses must be alert and responsive to the requirements of each surgeon and anesthesiologist in a situation where teamwork is paramount.

Interestingly, there is not a high turnover among Stanford nurses in Operating Room Services. Many have been here for more than five years. And occasionally, when surgeons leave Stanford for positions at other teaching hospitals, they "borrow" a Stanford nurse to set up their new units.

Nurses who are interested in state-of-the-art surgical procedures—lasers, organ transplantation, microsurgery—find the Stanford setting and the high skills of the surgeons stimulating and gratifying, despite the tension that characterizes the operating room environment. And Mailhot is particularly interested in helping the nurses expand their education and professional skills. They are talking together about ways in which nursing specialization can be intensified. At present, operating-room nurses rotate among the six major services. As physicians continue to become more specialized because of the intricacies of new technology, nurses cannot logically be expected to be experts in *all* specialties.

Nurses are also discussing what other peri-operative services (those surrounding the actual operation) they can perform to make patients' recovery smoother and speedier. They now see patients prior to surgery, and their assessments are added to the care plan. It is likely that soon the recovery room nurse will have a chance to talk to a patient back in the ward to get whatever feedback might be useful.

Claire Mailhot came to Stanford in 1972 from St. Mary's School of Nursing in Maine; fortunately, the decade has not totally effaced the "down East" in her speech. She continued college at San Francisco State University while nursing and received a master's degree from the University of California, San Francisco in 1978. That same year she was appointed clinical nurse coordinator on West 2B, an acute-care surgical ward. She became acting director of the Operating Rooms Service in March of this year and director in July. Now she hopes that she can use her management experience to give her staff what they need for excellent clinical performance because, as she says, "They are exceptional in their skills, their enthusiasm, and their interest in learning."

To her that means acknowledging and encouraging creativity, expertise, and professionalism. ■

Help on the Way—Department of Clinical Social Work

"Help!"

Sometimes the plea is voiced; sometimes it's unspoken.

In any hospital, but particularly in one that treats a high percentage of acutely ill patients, there is an intense need for help in coping with the emotional, financial, and family problems associated with hospitalization.

Many members of the Hospital community, including physicians and nurses, recognize those problems. One group is professionally trained and charged with the responsibility to deal with them: the social workers.

There are now 23 social workers and 3 translators in the Hospital's Department of Clinical Social Work, which is headed by a newly appointed director, Wilbur E. Wright. Wright brings more than twenty years of experience in di-

recting social services for hospitals and mental health programs to his Stanford position. He came most recently from the State Department of Health Services in Los Angeles and holds a master's degree from Fordham University's School of Social Service.

According to Wright, Stanford's department is one of the oldest in the United States. It was begun in 1913 after Dr. Ray Lyman Wilbur, then dean of the School of Medicine, later president of Stanford University, visited Massachusetts General Hospital and was impressed by the social workers there. Originally part of the School of Medicine, the division became a Hospital department September 1, 1981. Social workers are available to patients from the beginning of prehospitalization planning through the reentry problems of going home.

One stunning example of the services provided comes from Mary Burge, the social worker associated with the cardiac transplantation program. A member of the heart transplant team, Burge performs a psychosocial evaluation of all prospective organ recipients and their families to measure their ability to cope with demands and uncertainties of transplantation. If, after medical screening, the patient is accepted for surgery, there may be a long wait, sometimes up to six months, for a suitable donor organ. (Stanford does about 25 heart transplantations a year, 4 or 5 heart/lung units.) During that period, when the patient and family member are in Palo Alto, Burge helps with housing, financial arrangements, transportation, and emotional support. She provides information about the hospital stay, side-effects of medication, pain, aspects of the isolation to help the patient and the family have realistic expectations. And throughout the lengthy hospitalization, she is there to listen and counsel.

Another specialist in cardiac patients is one of Stanford's most senior social workers: Aaron Smith, winner of this year's Gonda Award for "most valuable Hospital employee." For the past eight years, he has dealt exclusively with children with heart disease or heart anomalies. Much of his time is spent in preparing children and their parents for surgery. He says that one of his most important functions is to facilitate communication among the family, the patient, and the physician.

Because many of the children remain in the hospital for a long time, it's hard for families to feel confident about their ability to care for them at home. For that reason, Smith and other social workers cooperate closely with the discharge planning group in nursing. For some patients, there must be changes in life style when they return home. Some families will have the ongoing problems that surround a chronic invalid. In many cases, Stanford social workers initiate an approach to a community agency that can continue the assistance outside the hospital.

All the social workers do individual counselling; Isabel Walker and Pat Fobair have initiated peer-group self-help for cancer patients as well. In such groups, the social worker is only the facilitator, encouraging patients to bring up the questions or issues they want to discuss: sometimes as straightforward as dealing with temporary baldness; sometimes as threatening as the death of a group member.

Walker, who is associated with the Oncology Day Care Center, has been meeting with patient

groups for three years and has expanded her schedule, at their request, to include couples, who meet in the evening. Fobair, with the radiation therapy clinic, has a group of young Hodgkin's disease patients who help each other get through the practical and emotional problems of treatment that is often debilitating and uncomfortable.

Wilbur Wright is proud of the Department's reputation and determined to coordinate patient services even better than they now are. The Department's training program is available for participation in the training of other Hospital staff in identification and management of social problems. And next year, he hopes to expand the training program for social workers to include graduate working interns in the department. Several members of the staff hold faculty appointments in the Department of Family, Community, and Preventive Medicine. ■

The View from the Director's Office

Of the more than 6,000 acute-care hospitals in the United States, approximately 350 are characterized as non-governmental teaching hospitals and about 130 of those as university hospitals. To be a teaching hospital means accepting, formally, part of the responsibility for educating physicians: both as medical students and as specialists receiving graduate training. This special obligation, an accepted responsibility for the selected hospitals, means that they offer a wide range of comprehensive health services. Patients who come for care to university hospitals can be assured that they will be provided *any* necessary service. This distinctly contrasts with other hospitals, which, however excellent, neither can nor need to provide a broad array of services.

You have undoubtedly, in your stay at Stanford, seen many young men and women wearing the traditional white outfit that stamps them as physicians, graduated from medical school and in the process of developing their skills in an intense, advanced training program. Here they remain under the supervision of senior physicians who completed their specialty training years before and who have remained on the hospital staff as practitioners and teachers. Most of these supervising positions are held by full-time faculty of the School of Medicine; physicians in private practice, who hold faculty appointments in the School of Medicine, also participate in teaching.

Teaching hospitals also extend their facilities for the education of other health professionals who are completing their clinical educations. Thus, one finds nursing students, physical therapy students, pharmacists, and other kinds of technicians and technologists receiving training here.

What does all this mean to the patients? It means an environment in which teaching and learning are stressed; in which new technologies are available for diagnosis and treatment. It means that you are seen and cared for by many more people than you would be in the traditional community hospital. It means that your hospital is a more expensive one in which to receive care because of costly modern technology and the additional costs of the medical education process.

In order to provide this care in the appropriate environment, a teaching hospital must remain modern, both in the technical and the physical sense. Here at Stanford, we continue our efforts to keep the Hospital in excellent repair and running order and to develop programs for replacement and modernization when that is necessary. The Hospital is planning a major redevelopment as part of what is called the Hospital Modernization Project, which is aimed at retaining Stanford's status as a leading university teaching hospital so that you can continue to receive treatment representing the most forward look in American medicine. ■

SHELDON S. KING

Did You Like the Food?

Were the servings large enough? Was the entree hot? Was the salad cold? Were the trays attractive?

Those are the questions that keep John Varnado, director of dietetics at Stanford Hospital, and his staff of two hundred jumping, and a topic that generates numerous patient reactions. Mr. Varnado talked about his progress and problems at the Hospital in a recent interview.

There are two million food transactions a year at Stanford Hospital: 1,450 patient trays daily and 4,500 daily cashier sales in the cafeteria and garden patio. Since Varnado has been at Stanford, a number of important changes in feeding patients have taken place:

. . . a new temperature maintenance system in which the base of the dish is heated.

. . . new china, glassware, and trays.

. . . new and improved tray-delivery carts.

. . . special event menus—monthly monotony breakers.

. . . a speedier operation from kitchen to bedside.

Five basic menus are available for patients, according to the diet order. They are: regular, soft/bland; sodium restricted; quantitative (calorie controlled); pediatric; and Spanish, which is the regular menu printed in Spanish and includes one entree of Mexican or Spanish origin. The regular menu has been modified based on risk-factors associated with atherosclerosis and cardiac disease. It limits sweets, sodium, and saturated fats. Clinical dietitians are available for nutritional counseling. Trays are available for patients' guests; wine may be requested with both lunch and dinner with physician's approval; and new mothers in West 3A receive a special celebration dinner.

Varnado has initiated a number of ways in which to judge the service. Every meal is sampled before the trays start through the serving line, and each dish has its temperature taken. Several times a month, Hospital staff members judge the general presentation and texture, taste, aroma, garnish, and attractiveness of the food. The ratings are relayed to the responsible kitchen employees who must—in case of low rating—propose a plan to improve the deficiency. Food for patients at Hoover Pavilion is prepared in the main kitchen, transported to Hoover, and reheated there in microwave ovens.

Several challenges remain for both Hospital administration and the food service managers. One has to do with rising food costs. The high-grade menus at Stanford Hospital are costly. Since the Hospital is constantly faced with the need to hold costs down—and food is a big item in total patient-day costs—the dynamics of cost control are like those of the family cook in a time of inflation on a vastly larger scale. The food budget alone for the next year is $2 million.

Space is the other major problem. The kitchen in which those 1,450 daily trays and 4,500 daily meals are prepared is essentially the same kitchen that was built twenty-three years ago when the Hospital opened. The cafeteria, which seats only 180, must feed 3,000 people daily in the course of three hours. For that reason, the cafeteria now has an "employees only" policy between 11:00 and 1:30. During those hours, Hospital visitors are asked to lunch in the Garden Patio, where the menu includes fresh delicatessen-style sandwiches and a salad bar in addition to the hot entrees.

The plan for hospital modernization includes expansion and improvement of the kitchen and cafeteria. Until its planning is translated to construction, John Varnado and his staff will simply deal with the cramped space and increased traffic with good cheer—and good food. ■

Stanford University Hospital is a private, nonprofit hospital, owned and operated by Stanford University. Its income is derived almost entirely (97 percent) from patient revenues. It has no endowment and receives no subsidy from the University. Unlike many community hospitals in California, it is not supported by taxes.

The Hospital was built, in part, by private philanthropy, and throughout its twenty-plus-year history, it has received gifts from grateful patients and their families and friends, as well as foundations, corporations, and associations.

Your gifts would be appreciated. If you care to make a tax-deductible gift to the Hospital, send it to Stanford Hospital, 780 Welch Road, Room 106, Palo Alto, California 94304.

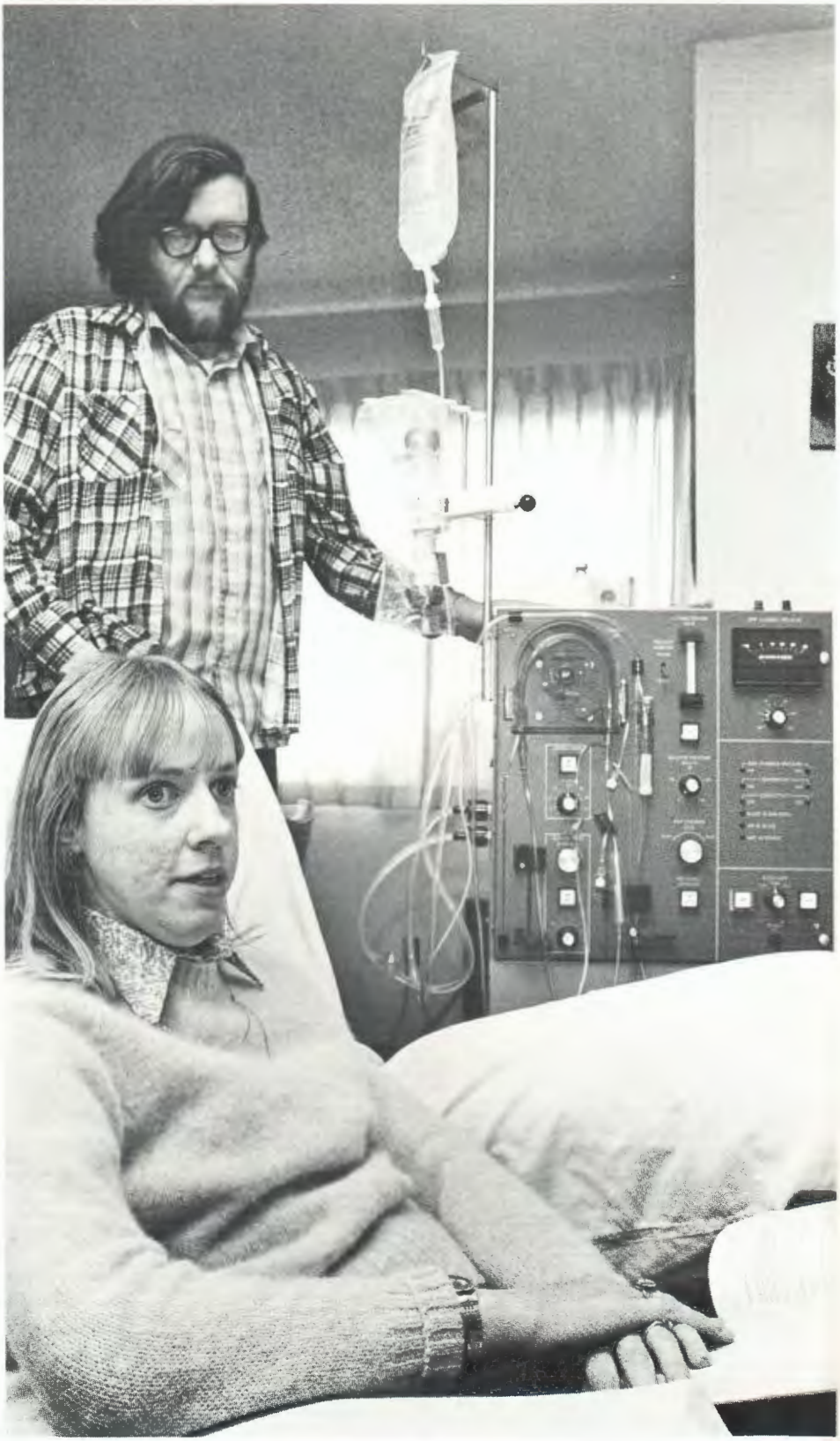
THE HEALING ARTS

A REPORT ON COMMUNITY OUTREACH FROM STANFORD UNIVERSITY MEDICAL CENTER • VOLUME XII, NUMBER 1, 1982

THE HEALING ARTS

Number 1, 1982
Volume XII

John Lindt helps his wife Alison with kidney dialysis at home. Although the four-hour procedure must be performed three times a week, "it doesn't really demand a lot of attention once you're used to it," John says. The machine is self-regulated and an alarm sounds if anything goes wrong.



Outreach

The Healing Arts is produced three times a year by the Stanford University Medical Center, as part of a community program of public information. Please address all correspondence to:

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Photography: All photographs by Ed Souza except pages 9, 15 and 19 by Jose Mercado; page 21 by Dana Gluckstein; page 23 (top) by Chuck Painter; and pages 7, 17 and 22 by Laura Hofstadter.

Cover: Many programs based at Stanford Medical Center reach out to the citizens in surrounding communities such as Palo Alto.

Extending the Boundaries of the Medical Center

It is a rainy Tuesday evening. Alison Lindt and her husband, John, both graduate students, settle in to study as raindrops lightly pummel the roof of their Livermore apartment.

John lowers himself onto the sofa. Alison sits back in a lounger to read her physics text. A tangle of tubing links Alison's arm with an imposing dial-adorned metal cabinet at her side. Above the soft rain patter, the gentle whir of the machine is the only sound that breaks the couple's silence.

Alison is a dialysis patient. She has no kidneys. They were both surgically removed after a long bout with incurable kidney disease. Now she relies on the whirring cabinet, a hemodialysis unit, to do the job her own diseased kidneys couldn't—the vital task of cleansing impurities and extra fluid from her blood.

Kidney dialysis is not uncommon—about 60,000 people in the United States with kidney disease require the lifesaving treatment. But most people travel to and from a special dialysis center three times a week for their four-hour blood-cleaning sessions. Although this dialysis routine saves lives, it drastically disrupts them.

That is why Alison and John enrolled in a special program at Stanford University Hospital that enabled them to administer the vital dialysis treatment to Alison at home. Now, instead of making the lengthy commute three times a week, they simply connect Alison to a dialysis machine in their living room.

For Alison and John, home dialysis has meant a normal lifestyle—they are able to continue their physics studies at the University of California and to work half-time in the biomedical applications unit of the Lawrence Livermore Laboratory. "Having to commute to a dialysis center several times a week can rule your whole life," Alison comments. "Dialyzing at home, I can schedule my own time and lead a normal life."

"Patients who dialyze at home tend to feel better physically and they feel more independent," adds Pam Simmons, R.N., clinical nursing coordinator for the Stanford Hemodialysis Unit. "Most are active, contributing members of the community.

"We have had as many as 30 patients on home dialysis at one time," Simmons says. Patients who express an interest in learning home dialysis must spend six to eight weeks in training, she adds, with their helper, a friend or relative who assists in the procedure.

Alison and John, who dialyzed at home for five years in Illinois before they moved to California, have perfected their evening thrice-weekly routine. "John sets up the machine, which takes about 45 minutes, and connects me up," recounts Alison. "I dialyze while we study together, and then he takes me off and does a 45-minute clean-up."

Two nurses at Stanford, Katy Rosenberg and Barbara Blake, specialize in home dialysis training, says Simmons. They teach dialysis patients and their helpers the mechanics of going on and off the machine, venipuncture, sterile techniques, maintenance of the equipment, and safety and emergency procedures (what to do in case of power failure, or in case of the patient's sudden drop in blood pressure, for instance).

The first run out of the dialysis center is a frightening prospect for most patients, Simmons says, so to encourage the patient's spirit and confidence, the training nurse is present in the home.

After that, the nurses visit each patient's home once every few months to check that the dialysis machine (on loan from Stanford) is in good repair. Telephone contact between the dialysis unit and the home patients about once a month ensures that any problems are identified early, Simmons adds.

"Reduced cost is another advantage of home dialysis," remarks Dr. Robert Swenson, associate professor of clinical medicine, and director of the dialysis units at Stanford and at the affiliated Veterans Administration Medical Center in Palo Alto. "It is the least expensive modality of dialysis treatment. On an annual basis it costs about half of the approximately $30,000 expense for incenter therapy," he explains.

Both centers initiated their home dialysis programs in the early 1970s, says Swenson, and have trained patients not only from all over northern California but from all over the world.

Karen Berman, social worker at the Palo Alto VA dialysis unit, cites an innovative program in which the Palo Alto VA recruits and pays helpers for those patients who wish to home dialyze but don't have a relative or friend at hand. Not only does this help the patients in question, says Berman but "it upgrades the community's store of trained technicians. Some helpers go on to pursue other health care careers in the the community."

Programs like home dialysis training are special; they help individuals while also enriching the community.

Home dialysis is community outreach at its best, but not in its only form. This issue of *The Healing Arts* magazine looks at the variety of outreach activities associated with Stanford University Medical Center and its affiliated hospitals. Some outreach programs are primarily educational, helping members of the community to learn more about their health, while others are research-oriented, helping to develop innovative methods for improving health care delivery. Others simply involve that "extra something" that makes a patient heal more quickly, able to return to an active and gratifying life. Although these programs and the people who run them don't always receive the headlines, without them people like Alison, and the community as a whole, would be visibly diminished.

A Regional Center for the Critically Ill

Five-month old Justin Christensen, previously a lively and healthy baby, had been stricken with pneumonia, and lay in the pediatrics unit at Santa Cruz Community Hospital. Although he had been hospitalized Friday and should have improved, by Monday the baby's condition was worse, baffling and taxing the small hospital's staff.

Monday evening, Justin's doctor approached the concerned parents, Max and Jan. He had considered carefully Justin's downward-spiraling course. He felt the Community Hospital did not have specialized facilities and staff needed to handle the very sick child, and recommended the baby's transfer to Stanford Hospital where pediatric intensive care was available around-the-clock.

At 11 p.m. the call came in to Stanford's Department of Critical Care Transport. It requested immediate transfer of a child with tentative diagnosis of severe viral pneumonia.

At Stanford, a trained dispatcher responded. Within minutes, equipment and a transport team—doctor and nurse—had been mobilized, and an ambulance was ready to wind over the darkened hills toward the coastside town, 50 miles away.

Bobbi Hackman, a Stanford pediatric nurse trained in transport techniques, recalls the late-night mission. "At the time of the transport, we didn't know exactly what was wrong so we had to be prepared for almost anything," she says. Even though she was a seasoned transport nurse, Hackman says that night, as always, "my initial emotion was a twinge of fear—what kind of condition would Justin be in?"

Justin's mother, Jan, remembers vividly the transport team's arrival shortly after midnight. "They entered with two enormous suitcases filled with everything they could need, and began carefully to go over Justin physically, checking all of his vital signs and all of his intravenous and monitoring lines."

In addition, the team not only conferred with the staff at Community Hospital, but they talked with Jan and Max: "We were involved from the beginning," Jan remembers. "They seemed gentle and concerned—the team impressed me right away."

Jan rode in the ambulance back over the night-blackened hills to Stanford while her husband followed shortly behind in their car. "It was pretty frightening because we didn't really know what was wrong or what was going to happen" she recalls. "But the team watched Justin carefully and every so often, Bobbi would say to me 'he's doing fine.' When we arrived at Stanford, there was a cot for me nearby Justin's bed."

Six hours later, Justin went into respiratory arrest but pulled through the crisis. Meanwhile, physicians at Stanford performed a biopsy and discovered that Justin had pneumocystis, a dire form of pneumonia. Jan spent many long and tense hours over the next few days and weeks, talking to her baby, caring for him. "It took four weeks before they knew he would make it," she says, "and nine weeks before he finally left the hospital."

Today, a year later, Justin is healthy, with no vestiges of his devastating illness, his mother reports. Stanford doctors had determined that a deficiency in Justin's immune system had made him highly vulnerable to pneumocystis, so he now receives regular gammaglobulin inoculations to bolster the immune deficit. He is expected to lead a completely normal life.

Although not every critical care transport has such a happy ending, the innovative service is credited with saving many lives. The need for such a transport program lies in the increasing sophistication and costs associated with critical care; not every hospital has the staff and equipment to deal with critically ill patients, explains Dr. Alvin Hackel, director of the Department.

The Transport Department, which developed from an earlier neonatal transport program, was formed in 1978 to provide high quality intensive care during interhospital movement of critically ill patients, he says. In 1981, 498 adult, obstetric, neonatal and pediatric patients were transported, most of them from community hospitals within 200 miles of Stanford. If, like Justin, the patient is located in a hospital within about 50-60 miles of Stanford, transport is completed by ground ambulance; if the patient is further away, an air ambulance may be used.

Although most often a transport brings a patient from a community hospital to Stanford, the service transports patients from community hospitals to other regional centers, when Stanford intensive care units are full.

The number of long-distance transports is also increasing, Hackel notes. "Our outreach area for specialty programs, particularly oncology and cardiac cases, extends far beyond California's borders," he remarks.

Patients have been transported from as far away as Central America and Hong Kong to Stanford Hospital. And transports have even returned people to their homes, far away; to London and Manila, for example.

An associated program that antedates the Department of Critical Care Transport by several years, is the Northern California Perinatal Dispatch Center (NCPDC), also directed by Hackel.

NCPDC, explains Hackel, helps physicians locate available intensive care beds for critically ill babies and high-risk maternity patients. The Dispatch Center also arranges for the transport of infants

or pregnant women from the community hospitals to the intensive care facilities when requested.

Calls are processed within 20 minutes, says Hackel. This is possible because neonatal bed availability is checked every eight hours by the center staff—there are over 250 nursery beds altogether in the 10 receiving hospitals within Stanford's regional area.

Prior to the establishment of the Center, it used to take doctors two hours or longer to find an available bed, he points out. "This extra time compromised the ultimate outcome of these patients," he says.

Stanford pioneered the program in 1974, and it operated on a pilot basis until it received State funding in 1976. The outreach region for the Dispatch Center covers almost 200,000 square miles. A similar Center that covers the lower part of the state is based at the Huntington Memorial Hospital.

At the Palo Alto Airport, a five-week old infant with severe pneumonia is rushed from air to ground ambulance on the way to Stanford University Hospital. Nurse Bobbi Hackman (far right) was a member of the Stanford medical team dispatched to retrieve the ailing child.

Lending a Hand to the Young and Old

Orthopedically handicapped children at Loma Vista Elementary School in Palo Alto listen raptly as Betty Lovelace describes what it's like to enter the Hospital. Lovelace and her colleagues visit local schools, on request, with their unique hospital orientation slide show and demonstration.

Make the Hospital look exciting to children! That's one challenge for Stanford Hospital's pediatric play therapists—Betty Lovelace, Colette Case and Ellen VanderWilt.

They are the Hospital's ambassadors to youth and special friends to children while they're hospitalized.

Every Sunday afternoon, through a carefully organized slide show, the recreation therapists introduce Stanford Hospital to young patients scheduled for admission. They are also frequently called upon to present their show at local schools as a health education tool for children.

Slides take the children from the admission desk all the way to the trip back home, while the play therapists narrate the story with scripts appropriate for each age group.

"We try to give a feeling for the sights and sounds of the Hospital, and introduce the different people children are likely to meet," Lovelace explains. The slides show the strange world of hospital corridors and nursing stations, hospital beds and controls, bedpans, gurneys, and all the paraphernalia required for tests and procedures.

Handcrafted puppets and life-like dolls serve as models for demonstrating unfamiliar items including cast material, tubing, anesthesia masks and syringes. Children are encouraged to practice hospital experiences with stuffed animals or with each other.

The play therapists use a miniature hospital for pre-surgery orientation, tracing the entire sequence of events beginning with pre-operative preparation. They describe the operating room suite, anesthetic "sleep," the recovery area, and "waking up."

Convincing proof of the program's success, says Lovelace, was the time one of her young patients confessed, "it's not that bad things don't happen here, but at least there are no bad surprises."

Bad surprises for parents of premature infants are what the staff in the intensive care nursery (ICN) hope to avoid. Twice a month, parents of children in the nursery meet with social worker Charlene Canger and other ICN staff members, to talk about their children. The sessions take an educational focus, says Canger, who attempts to demystify the busy world of the nursery for apprehensive and worried parents. Parents learn what to expect when they take their babies home—how growth and development rates may be different for their child as compared to a non-premature child, for instance.

Sometimes joining in the sessions are parents who have lived through a premature child's birth. They add an experienced yet non-professional point of view, Canger points out.

Parents who have babies in the intensive care nursery are often fearful about caring for their infants once they

Ingrid Wilson, a second-year student who took Leona McGann's course on health insurance issues, recently completed a major study of how physicians charge their elderly patients for medical services. Here, she describes the results to a group of health insurance counselors at the Palo Alto Senior Center.

are discharged from the Hospital and sent home.

"We have many babies that may be at risk for sudden infant death syndrome (SIDS)," explains Barbara Cobb, R.N.. "Parents of high-risk infants with a long hospital history become very frightened at the prospect that, once home, their child might suddenly stop breathing," she adds.

Cobb has put together a weekly session for these parents (and other members of the family) to train them in infant cardiopulmonary resuscitation (CPR), mouth-to-mouth and heart resuscitation, and removal of airway obstruction. They practice on dolls, Cobb explains, so that the parents become familiar with the techniques—that way, the behavior becomes reflexive and they won't panic in a crisis.

Another program to help families make a smooth transition from intensive care nursery to home is run by the unit's discharge planner, Kathy Petersen. "I spend a lot of time coordinating efforts with outside community resources such as public health nurses," says Petersen, "as well as augmenting the home care training offered in the Hospital."

Parents can "practice" caring for their infants by making overnight stays in the Hospital's "parent room," set aside for this purpose. Petersen oversees these rehearsals.

Though all the ICN family-support programs are optional, they serve an important purpose. The overall goal of this early intervention is to help parents participate in their child's best development and prevent avoidable problems associated with birth-related disabilities, Petersen stresses.

At adolescence the concerns that are often foremost in the minds of the young have to do with their own developing bodies and budding sexuality.

Dr. Paula Duke, assistant professor of pediatrics, has served as a special consultant to the Palo Alto School District, where she initiated a school program in puberty education that has been incorporated into the seventh grade curriculum.

"Our interest has been with 10 to 13-year olds who often get overlooked," explains Duke. "At this age, the normal concerns aren't so much with interactive sexuality as with how kids feel about their own bodies as they begin to change."

Duke herself taught the first classes at Jordan Junior High School several years ago, and now guides the P.A. School District's own teachers who have since taken over the primary teaching roles. "The teachers are very enthusiastic," says Duke, "and may even begin similar programs for younger grades. If we can get kids talking at this age, it may help when they do become sexually active," she points out.

Dr. Iris Litt, director of adolescent medicine at Stanford, has established ties with an entirely different type of community agency for youngsters, the Santa Clara County Juvenile Detention Facility. Litt also consults with Santa Clara Valley Medical Center—where most of the juvenile offenders receive medical treatment—about ways of improving care.

Because Medicare covers only about 40 percent of medical care costs of the elderly, supplemental health insurance coverage is an important issue for older people.

One elderly woman sold her furniture to pay for medical expenses when she actually qualified for MediCal.

A man who was entitled to Medicare benefits didn't know he could collect for laboratory expenses.

A 76-year old woman carried four supplementary health insurance policies costing over $750 each year.

People like these now find help from a manual on health insurance for those over 65. The book provides guidance on Medicare and MediCaid coverage, how to choose supplementary health insurance policies, alternative sources of health care in the community, and how to set up a local health insurance counseling program for seniors.

The book's authors are Leona McGann, assistant professor, and Elizabeth Taft, lecturer, both from the Department of Family, Community and Preventive Medicine at Stanford.

Responses from a survey in a local retirement complex convinced McGann and Taft that most seniors need more information about health insurance. Many of these elderly people knew little about their coverage and eligibility for benefits, how to submit bills or how to collect payments due them, according to McGann.

McGann and Taft initiated a local training program for health insurance counselors, from which the book developed. They have since trained over 300 counselors throughout California and the program has expanded nationwide.

McGann also teaches a course for medical students on health insurance issues, and her students are encouraged to undertake independent study projects. Ingrid Wilson, a second-year medical student who took McGann's course, recently completed a major study of how physicians charge their elderly patients for medical services. She carried out the work in collaboration with the health insurance counselors at the Palo Alto Senior Center.

To Help the Dying Have a Good Death

"Mr. H. died Thursday evening peacefully. His family was present, and his daughters asked Phyllis, Mr. H.'s nurse, to stay in the room with them. The family appreciated our hospice program, and hospice staff, in turn, had a very good feeling about this family. Just before his death, Mr. H. had a long talk with both of his daughters."

Nurse Joan Armer talks with 66-year old Thomas Mendoza, a terminal cancer patient in the hospice unit at the Veterans Administration Medical Center. Armer, who has worked on the unit for two-and-a-half years, says simply, "Hospice is why I'm in nursing."

These notes of a cancer patient's death were summarized by a nurse associated with the Palo Alto Veterans Administration Medical Center Hospice Program. When a cancer patient faces sure and near death, a major challenge is to make his remaining life, as well as death, as dignified as possible. This is the purpose of the VA Hospice Program directed by Dr. Dayton Misfeldt, associate professor of medicine at Stanford.

The concept behind hospice care is to provide medical and emotional support to cancer patients facing life-threatening illness, and to their families. "Hospice is a program rather than a place," observes Misfeldt.

Patients accepted into the program, along with their families, are assisted in both home and inpatient care using a variety of VA and community services.

Although the program has five hospital beds reserved for hospice patients, some never become inpatients and may even choose to die at home, while others use inpatient services extensively, says oncology nurse specialist Peggy Keeler, program coordinator. About 40 patients at any one time are participants in hospice, says Keeler.

When patients are at home, hospice staff maintain close telephone contact and arrange for community agencies to provide services such as occupational, physical or speech therapy, skilled nursing care, home health aid, homemaker services, and psychological support through KARA or VA community services. The VA will also loan beds, wheelchairs, walkers and other supplies to home patients.

When pain or other medical complications cannot be handled at home, or when families need a respite, hospice patients are encouraged to enter the inpatient unit, located at the Veterans Hospital in Menlo Park, for as long as necessary.

Despite the fact that hospice patients face inevitable impending death, the program is a highly positive one, Keeler says. "If we can improve the quality of life in those last few months, then the program has been a success," she explains.

Care That Goes Beyond Hospital Walls

Many cancer patients can leave the Hospital but still require some nursing care at home. Their friends or relatives can learn home nursing skills through a Red Cross course initiated by Stanford oncology social worker Isabel Walker (right).

Patients at the Oncology Day Care Center at Stanford may be referred to hospice programs in the community or at the VA, when appropriate. In addition, friends and relatives of Stanford cancer patients may participate in a short course in home care so that they can care for the individual after he leaves the Hospital.

The six-hour course was initiated at Stanford and is now offered by the Palo Alto Chapter of the American Red Cross. Family referrals to participate are coordinated by Isabel Walker, social worker, and the nursing staff of the Oncology Day Care Center. The endeavor is an attempt to "extend services to the home using existing community resources," says Walker.

In 1980, Joan McVicker's daughter Lori, then 18, was treated at Stanford for a form of cancer called lymphoblastic lymphoma. Just before Lori went home, her mother took the Red Cross course and became her daughter's nurse. She was trained to give Lori her medications, to take her temperature and blood pressure, to give her bed baths, to monitor her nutrition and to do all the things a home nurse would do.

"Lori had problems swallowing her medications," Mrs. McVicker said. "Every time I gave her a pill, she would choke." The Red Cross taught her how to take two spoons, crush the pill between them, and cover it with apple sauce.

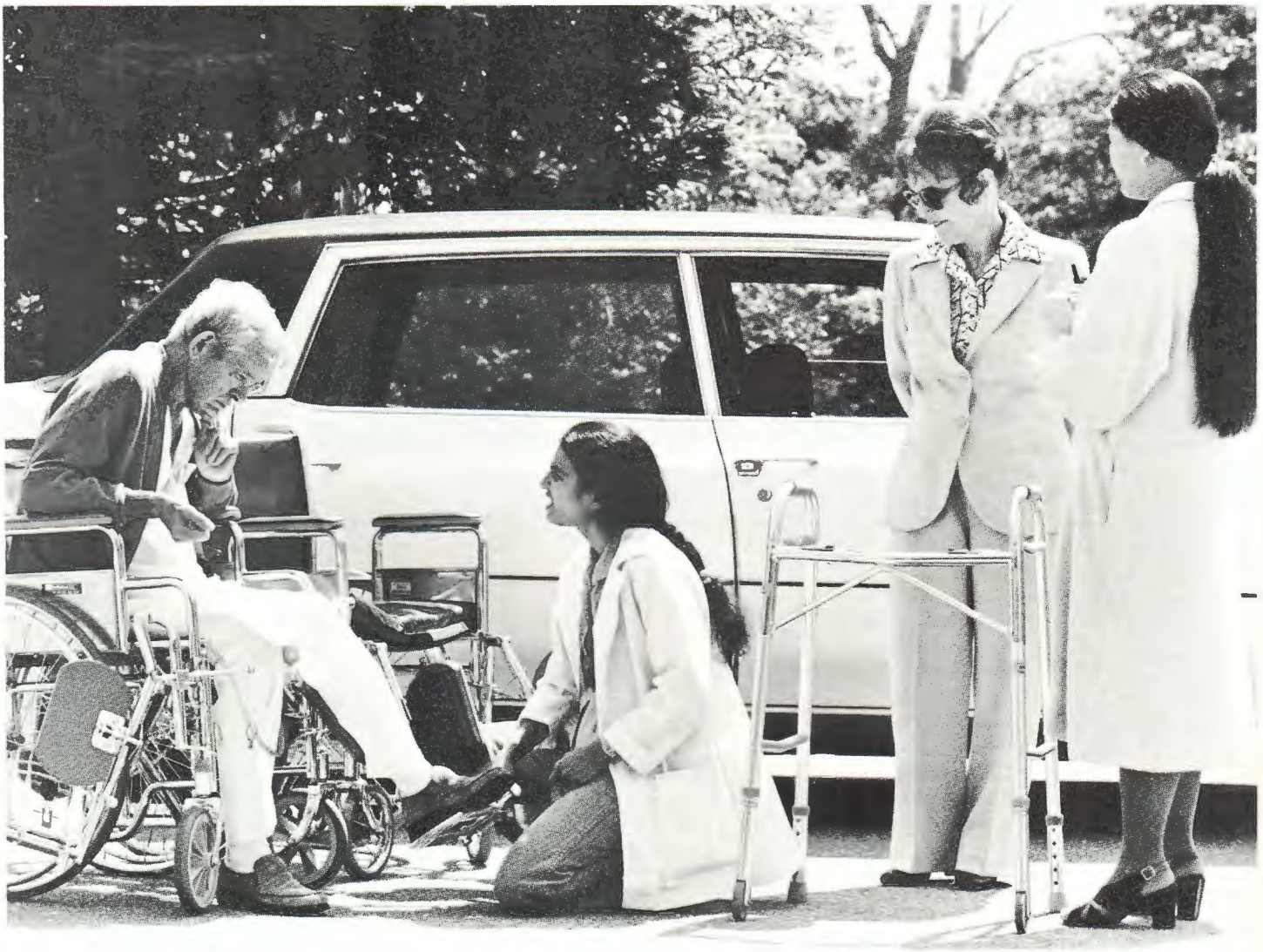
Sometimes, she had to lift Lori out of bed, but "I learned how to pick her up without hurting my back," Mrs. McVickers recalls.

The home care course is coordinated each month by Red Cross volunteer nurse Gladys Fiske and is taught by trained volunteer nurses in the community—Stanford nurse Barbara Reville is one of them. Walker adds a section on the psychosocial aspects of living with cancer. Over 100 families have taken part during the course's two years of existence.

Today Lori is in remission and living an active life, with a part-time job and going to school. But Mrs. McVicker still thinks about the course and how it helped them both through a very difficult time. "When I took the course," recalls Mrs. McVicker, "I felt I was the only person facing a loved one with cancer. I discovered a lot of other people were there for the same reason and that we had a special bond."

Coordinated Community Care:

Eighty-year old Earle Smith listens intently to occupational therapist Matra Majmundar, who is teaching him how to transfer himself from a wheelchair to car with the aid of a walker. After spending five weeks in the Hospital, suffering from a neurological disorder that left him without sensation from mid-chest down, Smith was eager to return home with his wife Dorothy (second from right).



A Headstart Home

There are other types of training and preparation that can ease the transition from hospital to home.

In earlier days when patients had complex or chronic illnesses, they would spend considerable time recuperating and rehabilitating in a hospital. Now, because of changing times and high costs, many patients, once their medical crisis is over, are getting long-term care at home. At Stanford, home care is organized by a team of health professionals who begin planning for it almost as soon as the patient is admitted.

Carol Ashton, R.N., oversees all "discharge planning" at Stanford. She explains that discharge planning may involve recommending continued physical therapy at home so patients can recover strength, teaching them how to take their own medications, advice on insurance coverage, or lining up a variety of support services from the community, such as Meals on Wheels, part-time household help, or visiting nurses.

"We spend much of our time on the phone with professionals in the community," says Ashton. "Last year, we made over two thousand referrals to community agencies."

One dramatic example of home care is the home parenteral nutrition training

In order to discharge Smith, many arrangements for equipment and home care had to be planned by discharge coordinator Jeanette Muzac (opposite page, far right). "I was as helpless as any patient they get," remarked Smith, who with humor and pluck, succeeded in mastering the wheelchair-to-car maneuver in record time. "I never believed I'd get in a car again," he beamed later.

program (HPN). HPN is intravenous feeding for people who cannot receive adequate nutrition by mouth. These patients receive a permanent catheter (or thin tube) which goes directly to the heart. A balanced and concentrated mixture of sugars, proteins, salts, minerals and vitamins is fed through the catheter by infusion pump into the heart, where it is quickly diluted and distributed throughout the body. Ten years ago, this treatment had to be administered by physicians in the hospital; today, Stanford patients are taught to feed themselves, and can then go home.

Pharmacist Tim Cheung and nurse Amy Andolina are primarily responsible for the home parenteral nutrition training program at Stanford. Using a manual and videotape developed in the Hospital, patients learn how to prepare the sterile solution, how to operate the IV pump and how to perform catheter care at home. This training helps patients feel self reliant away from the hospital, say Cheung and Andolina. In addition to giving patients back their independence, the program saves money, they add.

Another approach to the care of patients with chronic illnesses involves a program called "co-care," or coordinated care. When a physician places a patient in this program, says Ashton, a special team meets with the patient and family within 24 hours. (Team members may include, in addition to nurses and doctors, physical, occupational and speech therapists, dietitians, social workers, discharge planning coordinators, and others.)

"We assess the patient's physical and psychosocial needs and settle on a program for handling the patient's care," explains Ashton. "This allows us to approach the problem in a unified way and not give the patient and family conflicting opinions and messages."

In 1981, 218 patients participated in the co-care program which, so far, according to Ashton, is working incredibly well. "The family's stress level visibly diminishes when we work out the patient's needs and how to meet them," she reports.

Education: Getting the Message Out

The floor is littered with limp bodies; rescuers crouch over the lifeless, desperately attempting to blow breath into their still forms. Grim faces of the rescuers strain with the effort, while words of support and encouragement come from helpers nearby.

It looks like a cluttered emergency scene following a grave disaster, but it's actually Stanford Hospital emergency department's life support training center, a facility dedicated to training local citizens and health professionals in the skills of cardiopulmonary resuscitation (CPR) and advanced cardiac life support (ACLS) techniques.

The center, which opened in 1980, was constructed largely through donations from local service clubs and businesses.

"The goal," says Dr. Michael Eliastam, Stanford emergency services director, "is to saturate the area with people trained in CPR."

On the Peninsula, the American Red Cross and the American Heart Association traditionally have certified local citizens in life support techniques.

Community members practice life-saving skills on a dummy during classes run by the Palo Alto Junior League, and held at Stanford's Life Support Training Center.

Participants in an arthritis self-help course learn exercises which help to minimize pain while increasing mobility. Classes meet two hours per week over a period of six weeks. This class, led by Elaine Lotter and Ruth Erickson, was held at Menlo Park's Little House.

The Center and its equipment are available to these organizations for their training activities, as well as to members of local service clubs who are trained as instructors and, in turn, can train others in their group at the Center. Kathy Ladra, a Palo Alto Junior League volunteer, runs some of the training sessions for citizens. She notes that many people become involved through a personal experience, having seen a family member or friend in trouble.

Since the Life Support Center opened, over a thousand people have learned the fundamentals of CPR, usually in two sessions about four hours in length. CPR skills provide life-sustaining care until an ambulance arrives, or a victim can be otherwise transported to an emergency department.

ACLS training, more technical than CPR, involves the use of drugs, intravenous lines, electrocardiogram and breathing assistance machines, as well as defibrillators. About 500 individuals, most all health care professionals, have been trained in ACLS techniques by the Center's staff, coordinated by Todd Kiskkadon.

Another successful training venture is an arthritis self-help project conducted by Drs. Kate Lorig and Halsted Holman through the Stanford Arthritis Center.

The self-help project revolves around classes on arthritis self-management held in communities throughout the Bay Area. Following specially trained lay leaders, the class members practice exercise and relaxation techniques, discuss nutrition, medications, and generally work on problem-solving for the physical and emotional aspects of arthritis.

All of the leaders, trained by Lorig, are citizens within the community, most of whom have arthritis themselves or in their families or feel a strong personal desire to help those with the often crippling disease. More than 100 local citizen-leaders have been trained since the project began three years ago; the oldest group leader is 84, the youngest 19, and classes are held regularly throughout the counties of Santa Clara,

Dr. Kenneth Melmon talks about drug interactions during filming for a five-minute segment on public television station KQED. The segment is part of series called Health Notes, *coordinated by Dr. David Watts of the University of California, San Francisco.*

San Mateo, San Francisco, Alameda, Marin and Mendocino.

So far, over two thousand people with arthritis have taken the classes. "Our early results indicate that people who take the course are more active than similar arthritis sufferers who don't, and the course participants generally experience less pain from their disease," Lorig says. The research is funded by the National Institutes of Health (NIH) and the National Arthritis Foundation (NAF).

The initial success has been such that, in cooperation with the NAF, the project has expanded across the country, with similar classes recently debuting in 20 cities nationwide.

Small community-based classes of this type are often associated with research projects, which are unique to major medical teaching hospitals like Stanford's. Another example involves Dr. Jerome Yesavage, assistant professor of psychiatry and behavioral sciences. He is investigating treatments for elderly people with severe memory problems, under a grant from the VA.

In order to compare a variety of memory-enhancing methods and to test new approaches, Yesavage and his associates offer workshops in the community to interested volunteer participants. Many of the free classes take place at centers and retirement communities for the elderly such as the Palo Alto Senior Center and Sunnyview, a Sunnyvale retirement home; others are based at agencies such as Jewish community centers.

A long-standing outreach tradition at Stanford Medical Center is the Progress in Medicine lecture series, initiated in 1966. It brings leaders in academic medicine and community physicians to the podium to share their insights with interested citizens.

Always popular events, the lectures have covered topics from birth to death, from sleep to sports medicine, the brain, the heart, or how to choose a physician.

The Medical Center sponsors scores of other public lectures year-round. One newer series, presented by the Department of Psychiatry and Behavioral Science's Alcohol Clinic, aims to increase the community's awareness of alcohol-related problems. Dr. Stephanie Brown, director of the Alcohol Clinic, hopes the lectures will encourage open discussion about alcohol abuse, and will open up avenues of support for troubled community members.

Lectures are just one method of conveying up-to-date health information to the community at large. Now, along with physicians from the University of California in San Francisco, Stanford Medical Center faculty members are dispensing useful medical information via the air waves, in a special series of five-minute episodes broadcast on KQED, the Bay Area's major public television station.

Dr. Kenneth Melmon, chairman of the Department of Medicine, represents Stanford in the TV venture. He explains that although medical programs have been produced before, the new series, called *Health Notes*, is unusual because the planning intimately involves three doctors from two major medical centers collaborating to produce advice on sensitive and previously little explored health topics.

The series, currently sandwiched between regular full-length programs, is scheduled to air through next Fall, under sponsorship of the Robert A. McNeil Foundation and the Henry J. Kaiser Family Foundation.

Paramedics, under medical supervision from Stanford Hospital's Emergency Department, rush to the aid of a cardiac victim. Mobile intensive care nurse Susan Bloom (opposite page, right), in the Emergency Department, reads signals delivered over radio from an on-duty paramedic unit.

"I feel that as an institution, we have an obligation to the public to get involved in this sort of public information programming," Melmon comments.

A man is stricken with chest pains. He coughs and chokes for breath. His coworkers jump to his aid; one of them calls emergency.

Within minutes, emergency medical technicians, dispatched from a nearby fire house, and paramedics are by his side. They make sure his airway is open, measure his vital signs and assess his heart function with a portable electrocardiogram (ECG) machine. So as not to lose important minutes during which he could be getting lifesaving drugs, the paramedics send the ECG patterns over radio to a specially trained nurse in Stanford Hospital's Emergency Department.

There, a doctor and a nurse together scan the ECG and decide that the man should receive intravenous drugs immediately to halt a rhythm disturbance of his heart. The nurse instantly radios back orders to the paramedics. Once he has been stabilized, the paramedics prepare to bring the cardiac victim to the nearest emergency department for further care.

Stanford Hospital's Emergency Department, open round-the-clock, serves as the base station for six paramedic units in the northern and central part of Santa Clara county. This service involves supervising the paramedics' activities in the field, ensuring that highest quality emergency medical care is delivered.

The Department's pre-hospital care program has offered field care training for the past eight years. Under its auspices, mobile intensive care nurses and mobile intensive care paramedics, from all over northern California and many Western states, have received emergency skills training.

Students: Bringing the Bounty of Medical Education Home

Physician assistant Al Coleman (left) and Dr. Malcolm Gordon tend a patient at Drew Medical Center in East Palo Alto. Coleman is a graduate of the Stanford-Foothill Primary Care Associate Program.

Al Coleman grew up in Watts, a Black ghetto in Los Angeles, where affordable, high quality medical care was a commodity as scarce as gold. When he left Watts as a young man, he entered the Air Force and as part of his tour of duty Coleman received fundamental training in medical care. That's when his vision of a career in medicine began to form.

"I remember a buddy telling me he hoped I would bring my medical experience back to the community," says Coleman. "That's what I wanted too, but I wanted to make sure I could really make a contribution when I got out."

Instead of returning to Watts after his Air Force hitch, Coleman entered the Primary Care Associate Program. A two-year course that trains people to be physician's assistants (PA's), the Primary Case Associate Program is based at Stanford Medical Center and is administered in cooperation with Foothill Community College in Los Altos.

Physician's assistants are highly skilled health care practitioners whose numbers are on the upswing in California and nationwide, explains Virginia Fowkes, Program director. PAs practice under the supervision of a primary care physician, and can handle many medical tasks, including physical exams, taking medical histories, assessment and management of common acute and chronic medical problems, treatment of wounds, and health education and counseling, she explains.

"As a PA, I do a little bit of everything," Coleman says. Based at Drew Medical Center in East Palo Alto, a neighborhood with a high proportion of Black, Hispanic and Asian residents, Coleman sees an average of 200 patients a month for both acute and chronic care.

Like Al Coleman, many PA's have a strong urge to help alleviate the health care needs of medically underserved populations, Fowkes explains. The Stanford program particularly stresses the need to fill this vast gap in the health care system, she says. The training program is run jointly with a consortium of community colleges around the state, some of which are in rural or other medically underserved areas.

Ron Garcia directs the program's Community Outreach Project. "One of our goals is to recruit minority applicants committed to health care professions and committed to returning to underserved areas of the state when their training is completed," he says.

About 85 percent of the Stanford Primary Care program's minority PA graduates currently work in state-designated health manpower shortage areas, Garcia adds.

At the statewide level, Stanford Medical School is involved in a federally funded program to improve the quality of health care delivery. The Stanford University Area Health Education Center (AHEC), one of eight regional AHECs in California associated with the eight medical schools in the state, was formed in 1980.

The AHECs work in partnership with the medical schools to address community needs in health manpower education, according to co-directors Virginia Fowkes, R.N. and Dr. William Fowkes, head of Stanford's division of family medicine. Stanford Medical School is also in partnership with the local South Bay AHEC, based at San Jose Health Center, in a medically underserved area of San Jose.

Among the goals of the Stanford AHEC are promotion of continuing medical education for health care

Daniel Waxer, a fourth year medical student, explains the immune system and its disease-fighting capabilities to a group of older citizens. Waxer's presentation was part of a class called "Paths to Wellness," held at the Palo Alto Senior Center.

professionals, decentralizing the clinical education of medical students, and recruitment of minorities into the health professions.

The area served by the Stanford AHEC consists of San Mateo and Santa Clara counties. To help carry out its activities, the AHEC has formed ties with the San Jose State School of Nursing, Foothill and DeAnza Community Colleges, as well as with Stanford Medical School and the Stanford-Foothill Primary Care Associate Program.

While they are still in school, medical students bring their training into the community. One example is a recent course called "Paths to Wellness," offered at the Palo Alto Senior Center (the city's community center for elderly people). Under the supervision of Gwen Yeo, an instructor in the division of family medicine, medical students prepare and deliver informative lectures on topics affecting the health of the elderly, such as nutrition, arthritis, vision and hearing impairment, depression and dementia.

The emphasis of the presentations is on health promotion and practical self-management of chronic health problems, explains Yeo, as well as recognizing the symptoms that signal the need for professional medical care. The medical students benefit by mastering new material and in learning how to communicate effectively with older adults, Yeo says.

The popularity of "Paths to Wellness" and the enthusiasm of the elderly pupils in the class speak for the benefits the seniors gain. At a recent meeting of the course the hottest topic for discussion was how to ensure that the class would be offered again the following year.

Students also go out to the community in formal preceptorship programs. As early as the first year of medical school, students interested in family medicine can get clinical experience by observing daily activities in a practicing family physician's office. Into the third or fourth year, students going into a variety of medical specialties can spend time in community physicians' offices, actually working with patients under the physician's direction.

Over 50 percent of Stanford medical students participate in such an experience sometime during their education, says Leona McGann, coordinator of family medicine clinical opportunities for students.

Students become familiar with the community and its resources, the spectrum of patient care, and the lifestyle of their preceptor, McGann explains. In turn, the community doctor's practice is augmented with enthusiastic and eager young trainees.

Dr. Douglas Jenks, a physician in family medicine at the Palo Alto Medical Foundation, has brought students into his office for the last six years.

"It's a very worthwhile educational experience for the students," he acknowledges, "and gives them an early sense of responsibility when they begin to interact with patients."

The benefits of the experience fall not only to the students, however. Jenks says that he gains, too, when a student works with him.

"It's very stimulating. The students are bright and interested," he says. "We discuss many different aspects of patient care, they ask good questions, and sometimes they contribute new and helpful information."

Inviting the Community In

Linda Northway, tour director, pauses with a group of Madera high school students near the Sherman Fairchild research building. Northway has also trained a staff of volunteers who help explain the intricate workings of Stanford Medical Center to visitors.

When Carolyn Adorni discovered in 1979 at age 26 that she had cancer of the lymph nodes—Hodgkin's disease—her doctor in Eureka referred her to Stanford Medical Center where she underwent an 18-week course of radiation therapy.

Like many cancer patients from out of town, Carolyn not only had to come to terms with her disease, but faced the additional hardship of finding housing in the expensive and crowded mid-peninsula.

But Carolyn was fortunate because she was chosen to participate in a program of subsidized housing for long-term outpatients at the Medical Center. The effort was initiated and supported by the Assistance League of Santa Clara County, a national non-profit volunteer service organization.

The League has leases on four apartments in the Oak Creek complex directly across Willow Road from the Medical Center. Each apartment can accommodate two people, the patient and a relative, and the League charges only $10 per day for the fully furnished apartments, including utilities. Presently, heart transplant recipients and cancer outpatients occupy the units, for up to nine weeks each.

Before they moved into the apartment, Carolyn and her sister had been forced to switch motels each week, after returning for therapy from weekend breaks at home in Eureka. Receiving four treatments a week, Carolyn had continually felt drained and nauseated, so the proximity of the apartment to the hospital was a great advantage.

Since the program began in 1979, more than 60 families have been served by the Assistance League's housing program, and they have never had a waiting list of fewer than eight patients. Social workers from the Hospital screen the patients who are selected on the basis of both financial and medical need.

"Collaborations of this type with community volunteer agencies have immeasurably enhanced our patients' well-being," says Jeanne Kennedy, Hospital director of community

One place familiar to almost everyone who comes to the Hospital is the gift shop, organized and operated by community volunteers in the Medical Center Auxiliary.

relations.

Kennedy, who has a special interest in community volunteer activities throughout the Hospital, recently initiated a pilot program to ease the patient's entry to the Hospital with the assistance of volunteer patient relations specialists.

The largest single group of volunteers in the Hospital is the Stanford Medical Center Auxiliary, a highly organized and active group of community members of all ages who donate time in the Hospital in order to serve its patients.

From the gift shop, where the Auxiliary volunteers provide all sorts of products for patients and their families, to time of discharge when they help patients on their way home, the friendly touch of more than 300 Auxiliary members adds a warm and personal dimension to patient care at Stanford Hospital.

Numerous other volunteers contribute a variety of skills and talents, in a unique collaboration that benefits the Medical Center and its patients as well as the community at large.

For instance, as members of the Palo Alto Art Club have discovered, art galleries are not the only place to exhibit paintings: hospital corridors do very nicely too.

Since 1966, Art Club members have received a showcase for their works at Stanford Hospital, whose staff and patients, in exchange, have been treated to a wide assortment of oils and watercolors.

Blood Bank volunteers help in the laboratories, transport blood, work on the mobile collecting units and do secretarial work.

Sixty or more volunteers work in the Chaplain's office. They do office work, or, after careful screening and training, work in direct contact with patients.

Wives of faculty and community physicians have a volunteer association that provides support to the Medical School. For years, the group has received local recognition for its handcrafted quilts, lovingly stitched and displayed in the community to raise scholarship funds for medical students.

The hospital can be particularly frightening for patients who don't speak English. For this reason, Kennedy has developed a "translator bank" of community members willing to volunteer linguistic assistance to patients when the need arises. Through the efforts of Kennedy's office, the Hospital now has a reserve of 52 volunteers representing 23 different languages, that range from Armenian to Yiddish.

Another community volunteer group, KARA, offers emotional support to patients in the Hospital. KARA members come into the Hospital to counsel patients and families dealing with critical illness, death or grief.

Not all volunteers provide service inside the Hospital.

When cancer patient Imogene Seaberg of Cupertino heard she had to come to Stanford every day for six weeks to receive radiation therapy, she didn't know how she would do it.

"It's bad enough to find out you have cancer," she said, "without having to worry about your transportation to and from treatment. Even if I had access to a car, sometimes I didn't feel up to driving."

Recognizing the special needs of these patients, the American Cancer Society and the Palo Alto area Red Cross operate programs to transport patients to and from medical appointments.

The oldest of the two, ACS's "Freewheelers," was started 18 years ago and now numbers about 45 drivers in the group. The Red Cross program, started just four years back, already has about seven drivers.

It may not be in the Michelin guide, but Stanford University Medical Center nevertheless draws an international crowd of tourists. Over 1,000 visitors in the last nine months have been guided through the research and patient care labyrinth that makes up the sprawling medical complex.

Like tourists anywhere they come in all shapes and sizes, says Linda Northway, who coordinates the new tour package out of the Office of Public Events, headed by Michael Cowan. One day a group of eager and career-curious high school students from San Jose will file through; the next day it might be a dozen camera-laden surgeons from Japan.

The tours are popular not only with out-of-towners and young people—there is growing demand for the tour from people in the community and from those who work in the Medical Center and want to find out more about the institution.

Parents-to-be have their own special tour program in the delivery suite and maternity units, coordinated by Barbara Petree, clinical nursing coordinator in the delivery room.

Two evenings each week and once a month on a Saturday, staff nurses escort expectant parents (and any other interested community members) through the delivery area, including the nurseries and the family birth room.

Delivery room staff also teach childbirth techniques to pregnant women in the community through adult education courses and other health care facilities in the area.

Exploring the Community: Fruits of Research

Just how much a focused outreach effort can accomplish is becoming clear from innovative research projects based at Stanford University School of Medicine.

For 10 years, a unique approach to reducing death and disability from heart disease has been studied by Dr. John Farquhar and his colleagues in the Stanford Heart Disease Prevention Program (SHDPP).

A major portion of this research aims at determining methods for educating people to alter their lifestyle in order to lower their heart disease risk "profile."

This portion of SHDPP is called the "community studies" because researchers literally are going out into local communities to do their work. (Collaborating with Farquhar and his medical colleagues are members of Stanford's Institute for Communication Research headed by Dr. Nathan Maccoby.)

The SHDPP's "Three Community Study," carried out between 1972 and 1975, demonstrated that people can be motivated to change their health habits and that information disseminated through the mass media, as well as by individual and group counseling, can influence people.

Three small towns in central California participated. Residents of Watsonville and Gilroy, the test communities, were supplied continuously, through newspapers, radio and television, with information about heart disease and about methods for changing behavior, while people in Tracy, the control community, received no special information at all.

"Our basic results showed that total risk declined approximately 20 percent in the target communities, Watsonville and Gilroy, compared with Tracy, the control," reports Dr. Stephen Fortmann, clinical instructor in medicine.

But the Three Community Study was not designed to detect actual changes in in heart attack and stroke rates, or changes in morbidity and mortality from cardiovascular disease. To take up where the Three Community Study left off, a "Five City Project" was initiated in 1980 and will continue through 1986.

The Five City Project is a larger study involving communities with populations of 50,000 or more—Monterey, Modesto, Salinas, San Luis Obispo, Santa Maria. It uses many of the media and educational methods developed in the Three Community Study.

"This is a low-level media approach," says Fortmann, with health education messages airing as public service announcements over television and radio, weekly columns in area newspapers in English and in Spanish, and occasional hour-long documentaries. Booklets and "tip sheets" for posting inside the home are distributed.

But the Five City campaign is not restricted to media. The help of community organizations and health professionals has been enlisted, particularly in the realm of stress management skills. Employers have begun smoking cessation classes and community colleges have initiated courses in weight control. In addition, a health educator has been hired by the program to coordinate smoking prevention and nutrition programs in the schools.

By enlisting the participation of community groups, Farquhar anticipates that the educational programs will continue long after Stanford's study is completed. "If it works—and the early signs are extremely promising—SHDPP will have helped lead the way to a method of reducing the risk of heart disease on a massive scale" through community awareness, Farquhar observes.

Now, modeled after the SHDPP, a pregnancy risk prevention program is taking shape at Stanford Medical Center. Under the direction of Dr. Paul Hensleigh of the Department of Gynecology and Obstetrics, and Dr. W. LeRoy Heinrichs, chairman of the Department, the project is a study of whether pregnant women can be taught measures that will reduce risk to their babies. Nancy Moss is project manager.

The greatest cause of infant death is prematurity, says Hensleigh. What is important is that many of the factors associated with premature birth can be prevented if women are aware of them and are motivated to take precautions. Among these factors are too little prenatal care, inadequate nutrition during pregnancy, use of cigarettes, drugs or alcohol when pregnant, and lack of knowledge about medical help for women with a history of pregnancy complications.

A large component of the project consists of an educational barrage concerning these risk factors, directed at pregnant teenagers in the test community, Fresno; the control city is Stockton. During a five year period, data will be amassed on all teenage mothers who deliver in both of those communities, with a special focus on birthweight and gestational period.

There will be a media component (radio, television and print) to the information campaign but more effort will be spent in conveying information about pregnancy risk factors through community groups, Hensleigh says. Schools, local health departments and social services agencies are all interested in participating, he notes.

Since behavior is so heavily dependent on a person's social network, he adds, part of the project's educational push will be targeted toward societal change as well as toward change at the individual level.

The initial phase of the project was funded by the federal Bureau of Community Health Services and the Henry J. Kaiser Family Foundation, Hensleigh notes.

Stanford's heart disease prevention program and high-risk pregnancy risk reduction project are just two examples of work that promises to improve community outreach methods. What is learned through research programs like these directly affects people all over—it helps health care agencies use the most effective approach in media announcements to educate the community,

Dr. John Farquhar, director of the Heart Disease Prevention Program (SHDPP), participates in an exercise class. The community component of SHDPP is helping develop new methods of reducing the risk of heart disease on a large scale.

for instance, or gives schools new guidelines for counseling youngsters in important health-related matters. Major university medical centers, like Stanford's, can carry out this kind of collaborative research because they have multi-talented faculties and large knowledge bases from which to draw.

Professional outreach, in the form of continuing education to all kinds of health professionals, is another activity for which university medical centers are uniquely prepared. Virtually every nurse, doctor and social worker, as well as every other type of health care professional in Stanford Medical Center, engages a substantial amount of time every month in lectures, seminars or workshops passing on their special expertise to others.

One organized program associated with the Department of Gynecology and Obstetrics is the Mid-Coastal California Perinatal Outreach Program (MCCPOP). The MCCPOP is coordinated at Stanford Medical Center in conjunction with the Santa Clara Valley Medical Center in San Jose.

In existence since July of 1980, the thrust of MCCPOP is to improve the outcome of high risk pregnancies through outreach activities at the professional level in the area from Burlingame to San Luis Obispo. Four other similar programs operate in other areas of California, and all are funded in part by the State.

Dr. Kent Ueland oversees the program from Stanford with nurses Cele Quaintance and Trish Berlin. Nurses and doctors associated with the program participate in seminars and bedside teaching at Stanford as well as at various community hospitals. The program also operates as a general clearinghouse for information relating to procedures for care of high risk mothers and infants. "It is really a collaborative relationship with community hospitals in our area," says Berlin, and it has been greeted enthusiastically by many of the hospitals involved, she notes.

Professional outreach is also done on an individual level—for instance, when Chaplain Ernle Young talks to staffers at Midpeninsula Health Service about death and dying, or when pediatric social workers Maria Nasjleti and Aaron Smith discuss critical illness in young people. It also takes on a formal shape at times—for instance, the Medical School's continuing education courses, run by Dr. Edward Rubenstein, provide up-to-date medical information to practicing physicians, and Department of Medicine chief, Dr. Kenneth Melmon has established the Stanford Community of Internists, a group of physicians from the faculty and the community who come together on a regular basis for dinner lectures. The group also sponsors an annual visiting lectureship that brings a distinguished physician to the area to talk in the community as well as at the University.

Giving Birth to New Concepts

Dr. Joseph Hopkins has been medical director of the Midpeninsula Health Service for five years. The Service has gained rapid popularity in Palo Alto and surrounding areas.

A number of community-oriented services born at Stanford Medical Center have fledged from the nest to go their independent ways. One of these is the Midpeninsula Health Service (MHS).

MHS was established in 1976 after many years of planning by local community organizations and Stanford students, faculty and staff; Dr. Halsted Holman, Guggenhime professor of medicine, was one of the prime movers behind its founding.

The basic goals of MHS are to minimize as far as possible the number of visits a patient must make to the physician; to reduce frequency and length of hospitalizations for members; and to educate members to take part in their own health care decisions. Thus far, it has gained strong respect within the community and maintains positive collaborative relationships not only with Stanford Medical Center but also with other physicians and health care facilities in the area.

The Spina Bifida Association at Stanford, an organization of individuals, families and health professionals concerned about this serious neuromuscular birth defect, also got its start at the Medical Center. Dr. Luigi Luzzatti, professor of pediatrics and head of the Stanford Birth Defects Center, helped form the Association in 1967 and he and other staff members of the Center continue a strong ongoing relationship with the group.

Luzzatti and his Center colleagues also maintain liaison with schools, public health nursing associations and other community groups, providing advice on the special needs of some people with birth defects.

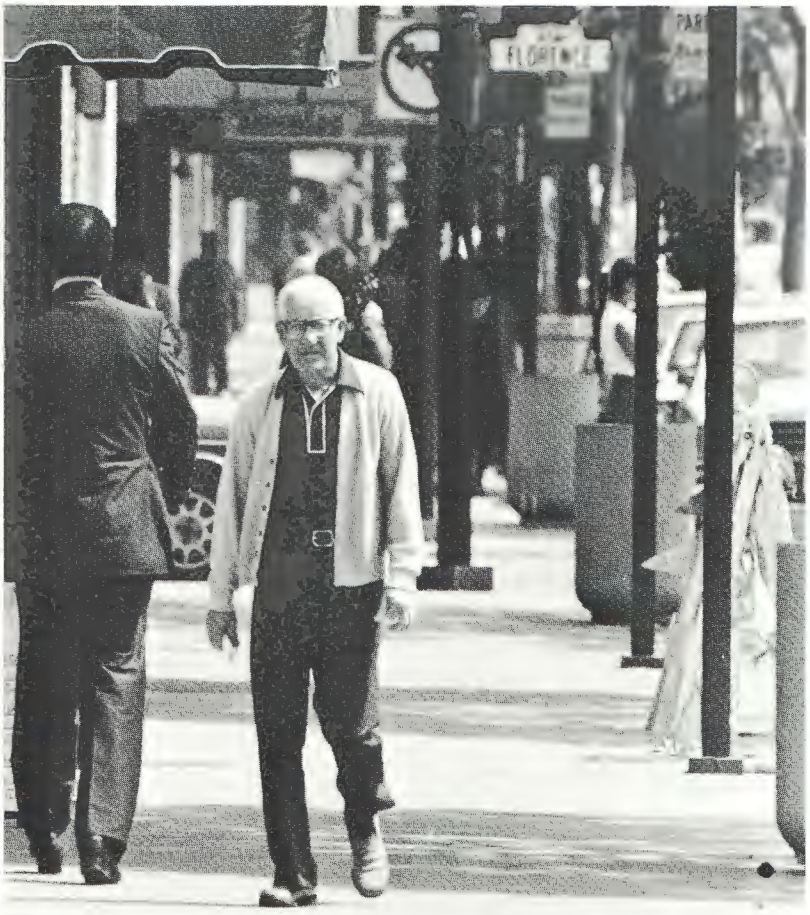
Another Medical Center-spawned organization is the Help Center, a counseling service available to the over 12,000 members of Stanford's faculty and staff and to their family members as well. The Help Center's services, provided free, are part of the employee benefits package, and they include individual, family, marital and job counseling. The Help Center also sponsors frequent support groups and seminars to help resolve personal problems.

Dr. David Kaplan, the Center's director, stresses the preventive focus to the unit which he sees not so much a clinic for "sick" people as a resource to "protect and enhance the work performance of Stanford employees, to help solve the normal problems of living before they become intractable."

Staffed by a cadre of dedicated clinical social workers, the Help Center maintains close ties with the Medical Center's Department of Family, Community and Preventive Medicine headed by Dr. Count Gibson.

The Help Center also joins with other campus groups in a variety of health-related offerings. A workshop in "back care," led by Terry Nordstrom of Stanford Hospital's occupational and physical therapy section, recently drew an eager lunchtime crowd on campus, for instance.

With the Heart Disease Prevention Program, the Help Center has joined in offering health improvement courses to the University community dealing with smoking cessation, exercise, nutrition and other preventive health concerns.



News Bureau
Stanford University Medical Center
Stanford, California 94305

Address correction requested

Third class mail

JEANNE D. KENNEDY
Director of Community Relations

STANFORD UNIVERSITY HOSPITAL
STANFORD, CALIFORNIA 94305

Room P3018 *(415) 497-7167*

DAILY SCHEDULE

	1	2	3	4	5	6	7	8	9	10
MON.										
TUES.										
WED.										
THURS.										
FRI.										
SAT.										

STANFORD BOOKSTORE
STANFORD, CALIFORNIA 94305
(415) 329-1217

49¢

STANFORD UNIVERSITY MEDICAL CENTER

1982 FACTS

Contents

STANFORD UNIVERSITY MEDICAL CENTER

In 1959, Stanford University School of Medicine moved from San Francisco to the Stanford University campus. Designed by architect Edward Durrell Stone, the interconnected building complex provided a new home for the School of Medicine with its associated clinics and a teaching hospital. Construction began in 1957. The first hospital patients were admitted in August 1959; in September, the first medical school classes were held on campus.

The Medical Center comprises the School of Medicine, the Clinics, and the Stanford University Hospital. Together, these elements perform three basic and integrated functions: teaching, research, and patient care.

The education and training of young doctors in the Medical School require the resources of a teaching hospital as well as the associated medical school outpatient clinics, where faculty members conduct their practice. The Stanford University Hospital, because of the special expertise of the physicians on the Medical School faculty, serves as a regional hospital for the care of patients with unusual and difficult medical problems. It is also a community hospital for patients from nearby areas under the care of their own physicians, many of whom serve as voluntary faculty members.

Medical Center Administration

Lawrence G. Crowley, MD
Vice-President for Medical Affairs

Dominick P. Purpura, MD
Associate Vice-President for Medical Affairs
Dean, School of Medicine

Sheldon S. King
Associate Vice-President for Medical Affairs
Executive Vice-President and Director,
Stanford University Hospital

Spyros G. Andreopoulos
Director of Public Information

John B. Ford
Director of Medical Development

Ross E. Campbell, JD
Managing Attorney for Medical Affairs

Philip G. Rector
Director of Facilities

David S. P. Hopkins, PhD
Executive Assistant to the
Vice-President for Medical Affairs
Director of the Office of Analysis and Planning

Lane Medical Library

Peter Stangl, Director

Lane Medical Library, founded in 1906, is a resource for the entire Medical Center and members of the Stanford University community. All alumni of the Medical Center have borrowing privileges. Any doctor may work in the library. Individuals and representatives of organizations or companies not connected with Stanford may arrange for borrowing privileges or access by payment of an appropriate fee. Arrangements may be made through the Library office, Monday through Friday, 8 to 5.

1980/81 Statistics

Periodicals and serials received	2,931
Circulation and reserve transactions	76,661
Loans to other institutions	17,440
Acquisition expenditures	
Journals	$271,099
Books	$51,266
Binding expenditures	$12,110

Growth of Collections

Year	Volumes	Year	Volumes
1970	227,458	1976	258,976
1971	232,449	1977	267,477
1972	237,878	1978	279,407
1973	242,638	1979	283,659
1974	247,284	1980	288,343
1975	252,839	1981	295,885

Stanford University Blood Bank

800 Welch Road
Palo Alto, California 94304

Edgar G. Engleman, MD, Director

Donor Appointments: 497-7831
Business Office: 497-7994

Hours

Tuesday	8:30 - 8:00
Wednesday	8:30 - 6:00
Thursday	8:30 - 6:00
Friday	8:30 - 3:00
Saturday	9:00 - 12:00

The Stanford University Blood Bank provides blood and blood products to Stanford University Hospital and Children's Hospital at Stanford, together the largest user of blood and blood products in northern California. In 1981, more than 13,000 units were collected from volunteer donors who are community residents and employees of nearby industries. The Stanford University Blood Bank, a division of the Stanford Medical School Blood Center, continues to expand its essential services to hospitals and to the community.

Office of Public Events

800 Welch Road, Suite 221
Palo Alto, California 94304
(415) 497-6389

Medical Center Tours

A general tour of the Medical Center is offered every Thursday at 1:30 p.m. Reservations are required, and no children under 16 are permitted. Tours for groups may be arranged. For reservations or further information, call 497-6389.

Progress in Medicine Lecture Series

These quarterly lectures, open to the public, report on recent advances in medical science. For further information, call 497-6389.

Medical Center Auxiliary

Dawn McClelland, President

Active volunteers	330
Total membership	600
Annual volunteer hours, 1980/81	57,500

Volunteers work in 18 service areas including admissions, baby photos, Emergency Department, escort service, flower desk, gift shop and cart, personalized patient services, pediatrics recreation, and information desks for intensive care and surgery reception. Their contributions to the Hospital since 1959 include more than 1,500,000 service hours and $702,600.

Auxiliary Center
W-157, Stanford University Hospital
Telephone: (415) 497-6636

SCHOOL OF MEDICINE

The Stanford School of Medicine was originally Cooper Medical College, which was incorporated in 1882 as a successor to earlier schools established in San Francisco by the University of the Pacific.

The Cooper properties were transferred to Stanford University ownership in November 1908, and all clinical and some basic science teaching took place in San Francisco for fifty years.

In July 1953, in the interests of enriching both the medical curriculum and the faculty's scientific opportunities, the University Board of Trustees undertook the planning for a move of the School to the main Stanford campus near Palo Alto. The first students to attend medical school in the new location began their coursework in September 1959.

Dominick P. Purpura, MD

Dominick P. Purpura, MD, became dean of the Stanford School of Medicine in January 1982. Dr. Purpura, an authority on mental retardation, had been professor and chairman of the Department of Neuroscience at Albert Einstein College of Medicine in New York. He also directed the Rose F. Kennedy Center for Research in Mental Retardation and Human Development. Dr. Purpura is a graduate of Harvard Medical School.

Deans

John Maxson Stillman, PhD
Acting Executive Head, 1910-11

Ray Lyman Wilbur, MD
Dean, 1911-16

William Ophüls, MD
Dean, 1916-33

Loren R. Chandler, MD
Dean, 1933-53

Windsor C. Cutting, MD
Dean, 1953-57

Robert H. Alway, MD
Acting Dean, 1957-58
Dean, 1958-64

Sidney Raffel, ScD, MD
Acting Dean, 1964-65

Robert J. Glaser, MD
Dean, 1965-70

John L. Wilson, MD
Acting Dean, 1970-71

Clayton Rich, MD
Dean, 1971-78

Lawrence G. Crowley, MD
Acting Dean, 1979-81

Dominick P. Purpura, MD
Dean, 1982-

Associate Deans

Franklin G. Ebaugh, Jr., MD
Veterans Administration Medical Center, Palo Alto

David H. Mendelow, MBA
Administration

Edward Rubenstein, MD
Postgraduate Medical Education

Elizabeth M. Short, MD
Student Affairs

James F. Silverman, MD
Clinical Affairs

John P. Steward, MD
Student Affairs

John L. Wilson, MD
Faculty Affairs

Department Chairmen

Anesthesia
C. Philip Larson, Jr., MD

Biochemistry
A. Dale Kaiser, PhD

Cardiovascular Surgery
Norman E. Shumway, MD, PhD

Dermatology
Eugene M. Farber, MD

Family, Community & Preventive Medicine
Count D. Gibson, Jr., MD

Genetics
Stanley N. Cohen, MD

Gynecology & Obstetrics
W. LeRoy Heinrichs, MD, PhD

Medical Microbiology
Stanley Falkow, PhD

Medicine
Kenneth L. Melmon, MD

Neurobiology
Eric M. Shooter, PhD

Neurology
David A. Prince, MD

Pathology
David Korn, MD

Pediatrics
Irving Schulman, MD

Pharmacology
Tag E. Mansour, PhD

Physiology
Eugene Robin, MD, Acting

Psychiatry & Behavioral Sciences
Thomas A. Gonda, MD

Radiology
Malcolm A. Bagshaw, MD

Structural Biology
James A. Spudich, PhD

Surgery
John A. Collins, MD

Division of Physical Therapy
Terry L. Sanford, Acting Director

Faculty

(September 1, 1981)

Regular Professoriate	
Professors	134
Associate professors	76
Assistant professors	132
Adjunct Professoriate	
Adjunct professors	15
Professors, clinical subjects	15
Associate professors, clinical subjects	26
Other Faculty	
Physician specialists	82
Senior lecturers, lecturers	10
Acting, visiting, consulting faculty	53
Active emeritus faculty	14
By courtesy	5
Total Faculty	562
Voluntary Clinical Faculty	1,393

Endowed Professorships

(Year established and current holder)

Arthur L. Bloomfield Professorship of Medicine (1954)
Kenneth L. Melmon, MD

Berthold and Belle N. Guggenhime Professorship in Medicine (1957)
Halsted R. Holman, MD

Emma Pfeiffer Merner Professorship in the Medical Sciences (1963)
Arthur Kornberg, MD

George DeForest Barnett Professorship in Medicine (1965)
Keith B. Taylor, MD

Jack, Lulu, and Sam Willson Professorship in Biochemistry (1966)
Paul Berg, PhD

Joseph D. Grant Professorship in the School of Medicine (1968)
Hugh O. McDevitt, MD

Walter Clifford Chidester and Elsa Rooney Chidester Professorship in Surgery (1970)
John A. Collins, MD

Maureen Lyles D'Ambrogio Professorship in the School of Medicine (1970)
Henry S. Kaplan, MD

Harold K. Faber Professorship in Pediatrics (1970)
Philip Sunshine, MD

Donald E. Baxter Professorship in Pharmacology (1972)
Tag E. Mansour, PhD

Emile Holman Professorship in Surgery (1972)
Robert A. Chase, MD

William G. Irwin Professorship in Cardiology (1973)
Donald C. Harrison, MD

Mrs. George A. Winzer Professorship in Cell Biology (1974)
Lubert Stryer, MD

Johnson & Johnson Endowed Professorship in Surgery (1975)
James B. D. Mark, MD

Marron and Mary Elizabeth Kendrick Professorship in Pediatrics (1976)
Irving Schulman, MD

Douglass M. and Nola Leishman Professorship in Cardiovascular Disease (1976)

Katharine Dexter and Stanley McCormick Professorship in the School of Medicine (1976)
Ruth T. Gross, MD

Frances and Charles Field Professorship of Cardiovascular Surgery (1976)
Norman E. Shumway, MD, PhD

Nancy Friend Pritzker Professorship in Psychiatry & Behavioral Sciences (1976)
Jack D. Barchas, MD

Carl and Elizabeth Naumann Professorship for the Dean, School of Medicine (1977)
Dominick P. Purpura, MD

George E. and Lucy Becker Professorship in Medicine (1979)
Thomas C. Merigan, MD

Thelma and Henry Doelger Professorship in Cardiovascular Surgery (1979)
Edward B. Stinson, MD

William M. Hume Professorship in the School of Medicine (1979)
I. Robert Lehman, PhD

One professorship has been established for a five-year term:

The Paralyzed Veterans of America Professorship of Spinal Cord Injury Medicine (1980)
Inder Perkash, MD

Students

Enrollment

(Autumn quarter, 1981)

MD candidates, all classes	375
Advanced degree candidates (non-MD)	187
Postdoctoral scholars	379

Undergraduate Origins, Entering Class

(86 members)

Stanford	12
Harvard	8
UC-Berkeley	4
UC-Santa Cruz	4
Other UC Schools	6
MIT	4
Princeton	4
Yale	3

1 or 2 students from 34 other institutions

MD Candidates, First-year

	Men	Women	Total (includes minorities)	Ethnic minority*
Applied	3,921	1,790	5,711	632
Enrolled	53	33	86	22

**Black, Chicano, Puerto Rican, Native American*

Degrees Awarded 1980/81

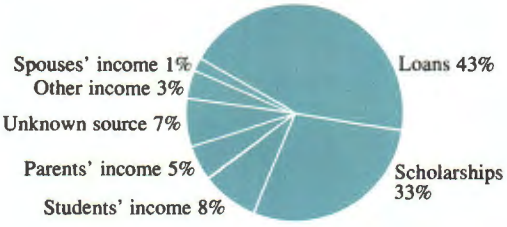
PhD	22
MD	83
AM, MS	32
BS	4
Total	141

Tuition Per Quarter, Selected Years

Year	Tuition	Year	Tuition
1920	$ 50	1970	$ 865
1930	115	1979	2,038
1940	130	1980	2,446
1950	260	1981	2,780
1960	335	1982	3,191

Support Sources for Students on Financial Aid

Students on financial aid	313 (80%)
Total support received	$3,962,068



Admissions Information

MD Program

Office of Committee on Admissions
Stanford University School of Medicine
851 Welch Road
Palo Alto, California 94304
Deadline for applications: November 1

Non-MD Graduate Programs

(Address specific department)
Stanford University School of Medicine
Stanford, California 94305

Financial Assistance, MD Program

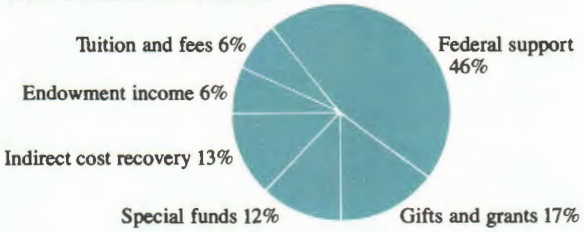
Katherine M. Kraus
Stuart N. Rosse
Stanford University School of Medicine, M-105
Stanford, California 94305

Financial Facts of the School of Medicine

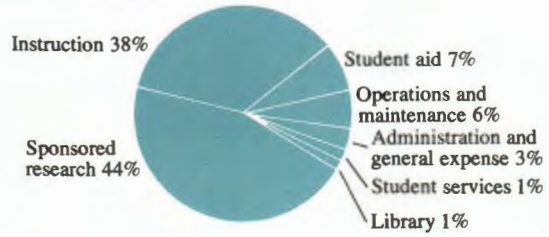
(Fiscal year ending August 31, 1981)

Total income $75,931,554, excluding plant improvements*

Where Funds Came From

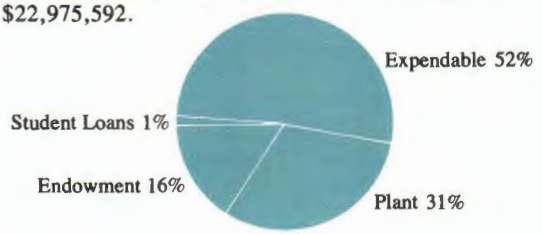


Where Funds Were Spent



Gifts by Purpose

In 1980/81, the School of Medicine received gifts of $22,975,592.



**Total operations $76,861,226, including $929,672 for plant improvements.*

Postgraduate Medical Education

Programs offered	900 hours
Attendance	3,863

Annual Interdepartmental Courses

January
- Modern Drug Therapy

February
- Basic Science for Clinicians

February/March
- Basic Neuroscience
- Biobehavioral Science for Psychiatrists
- Immunology

March
- Clinical Management

April/May (in Hawaii)
- Management of the Surgical Patient

July (in Hawaii)
- Cardiovascular Medicine and Surgery: An Advanced Course

November
- Intensive Care

Annual Departmental Seminars and Symposia

Clinical Pharmacology • Dermatology • Diagnostic Radiology • Medicine • Ophthalmology • Urology

Many special seminars and symposia are offered each year but are not scheduled on an annual basis.

For information, call or write
Office of Postgraduate Medical Education
TC-129, Stanford University Medical Center
Stanford, California 94305
(415) 497-5594

Associate University Ombudsman

Allen B. Barbour, MD
Professor of Clinical Medicine, Emeritus

800 Welch Road, Suite 221
Palo Alto, California 94304
(415) 497-6494

Medical Alumni Association

Members	3,014
Associates	1,599

Officers

S. Gainer Pillsbury, MD '57, President
Roy B. Cohn, MD '33, President-Elect
Don R. Goffinet, MD '64, Secretary-Treasurer
Allan H. Goodman, MD '61, Committee Member at Large

David A. Rytand, MD '33, Director of Alumni Relations

Spyros Andreopoulos, Editor, *Stanford MD*
Michael Cowan, Administrative Director

For information, call or write
Stanford Medical Alumni Association
800 Welch Road, Suite 221
Palo Alto, California 94304
(415) 497-5064

Stanford Nurses Club

Founded in 1961 as a chartered club of the Stanford Alumni Association.

Members	650

Executive Board

Patricia Sparacino '70, President
Eleanor McCalla '66, Vice-President
Alice Wong '62, Secretary
Ginger Wilson '68, Treasurer
Jane Binger '73
Caroline Zlotnick '62

For information, call or write
Post Office Box 9340
Stanford, California 94305
(415) 387-8682

CLINICS

The Stanford University Clinics, the base for the Medical Center's Faculty Practice Program, represent the private outpatient practice of the School of Medicine's full-time faculty. In essence, the Clinics are a university-based, multispecialty group practice. Their structure is different from that of other medical clinics in the area only in that they also serve as a classroom for the School's medical students, residents, and postdoctoral fellows.

Patients are accepted in the Clinics by referral from the primary care physician; in many clinics, patients may request appointments directly. For information about appointment procedures, call (415) 497-5631.

Clinics

Anesthesia
C. Philip Larson, MD, Chairman
Pain Service

Cardiovascular Surgery
Norman E. Shumway, MD, Chairman
Cardiovascular Surgery
Cardiac Transplant
Peripheral Vascular Surgery

Dermatology
Eugene M. Farber, MD, Chairman
General Dermatology
Contact & Industrial Dermatitis
Cutaneous Surgery
Dermatologic Psychiatry
Diseases of the Mouth
Microscopically Controlled Fresh Tissue Surgery
Mycology
Pediatric Dermatology
Plethysmography
Podiatry
Nail
Psoriasis Day Care Center
Psoriasis PUVA Therapy
Psoriasis Research
Skin Cancer

Gynecology & Obstetrics
W. LeRoy Heinrichs, MD, Chairman
- Colposcopy
- Endocrine & Infertility
- Normal Prenatal
- Oncology
- Routine Gynecology
- Special Obstetrics
- Stilbestrol Exposure
- Ultrasonography

Medicine
Kenneth L. Melmon, MD, Chairman
- General Medical
- Stanford Medical Group
- Hypertension
- Allergy
- Immunology
- Cardiology
- Preventive Medicine
- Endocrinology
- Gastroenterology
- Genetics
- Hematology
- Infectious Disease
- Nephrology
- Oncology Day Care Center
- Chest

Neurology
David A. Prince, MD, Chairman
- Adult/General Neurology
- Multiple Sclerosis
- Pediatrics/General Neurology
- Pediatric Neuromuscular
- Pediatric Neuro-oncology

Pediatrics*
Irving Schulman, MD, Chairman
- General
- Allergy/Pulmonary
- Birth Defects
- Cardiology
- Dermatology
- Endocrine
- Gastrointestinal
- Genetic Counseling
- Genetic Metabolic
- Hematology
- Oncology
- Orthopedics
- Pediatric Surgery
- Premature Follow-up
- Renal
- Rheumatology/Immunology
- School Functions
- Spina Bifida
- Youth

**Pediatrics clinics, except for Genetic Counseling, are located at Children's Hospital at Stanford.*

Psychiatry
Thomas A. Gonda, MD, Chairman
- Adult Inpatient Services
- Adult Outpatient General
- Adult Outpatient Consultation/Liaison
- Alcohol Treatment
- Biofeedback & Stress Reduction
- Comprehensive Care
- Cancer Group Therapy
- Sleep Disorders
- Child & Adolescent

Radiology
Malcolm A. Bagshaw, MD, Chairman
- Nuclear Medicine
- Radiation Therapy

Surgery
John A. Collins, MD, Chairman
- General Surgery
  - Breast
  - Endocrine
  - Gastrointestinal
  - Thoracic
  - Peripheral Vascular
  - Enterostoma Therapy

Ear, Nose & Throat
  Audiology
Neurosurgery
Ophthalmology
  Contact Lens
  Corneal External Disease
  Glaucoma
  Neuro-ophthalmology
  Retina
  Retinal Electrophysiology
  Retinal Vitreous Surgery
  Strabismus
Orthopedics
  Hip
  Pediatric
  Surgical Arthritis
  Traumas
Plastic & Reconstructive
  General
  Hand
Thoracic Surgery
Urology

Clinic Administration

David H. Mendelow
Administrator, Stanford University Clinics
Associate Dean for Administration, Medical School

Ken Jensen
Controller, Faculty Practice Program

Vera Waechter, RN
Manager, Clinic Patient Services
Director, Clinic Nursing

Outpatient Visits

Year	Total Visits
1959/60	20,000
1964/65	86,742
1969/70	101,120
1974/75	134,507
1980/81	134,465

Faculty Practice Plan Executive Committee 1981-82

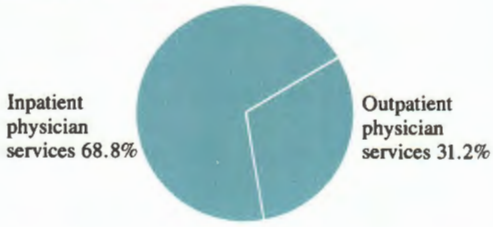
Kenneth L. Melmon, MD, Chairman
Lawrence G. Crowley, MD
David Korn, MD, Vice-Chairman
C. Philip Larson, MD, Treasurer
David H. Mendelow, Secretary
Alternates
Malcolm A. Bagshaw, MD
John A. Collins, MD
Thomas A. Gonda, MD

Financial Facts of the Faculty Practice Plan

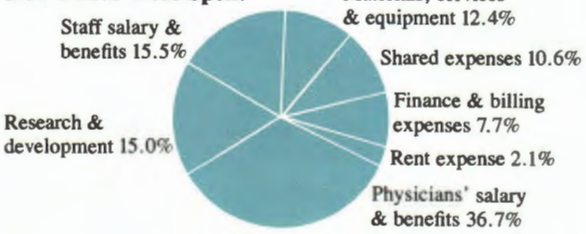
(Fiscal year ending August 31, 1981)

Total gross income $34,353,000

Where Funds Came From



How Funds Were Spent*



**Expressed as a percentage of net revenue after contractual disallowances and bad debt.*

HOSPITAL

Stanford University Hospital is a private nonprofit corporation, owned by Stanford University and operated without tax support or subsidy from the University. It provides patient care for Palo Alto and other mid-Peninsula communities and, in important specialties, serves patients from other parts of the United States as well as other countries.

Sheldon S. King

In November 1981, Sheldon S. King assumed the position of executive vice-president and director of the Stanford University Hospital. Coming to Stanford with a distinguished record as a hospital administrator, Mr. King had previously been director of the University of California at San Diego hospital and clinics. Mr. King is a member of the editorial board of the *Journal of Medical Education* and the author of numerous articles dealing with health management issues.

Board of Hospital Directors

The Stanford University Board of Hospital Directors is appointed by the general members of the Hospital corporation, who also serve on the Board of Trustees of the University.

Donald Kennedy, PhD, Chair
Walter L. Arons, MD
William E. Ayer, PhD
Peter S. Bing, MD
Lawrence G. Crowley, MD
Conrad F. Gullixson
Sheldon S. King
Kenneth L. Melmon, MD
William F. Massy, PhD
Linda R. Meier
Dean Morton
Nancy Barry Munger
Dominick P. Purpura, MD
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David J. Stone

Medical Board

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Duane D. Walker, RN, MS
Malcolm A. Bagshaw, MD
Melvin Britton, MD
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John T. Mehigan, MD
Kenneth L. Melmon, MD
Brian T. Paaso, MD
Jonathan Parmer, MD
David A. Prince, MD
Irving Schulman, MD
Norman E. Shumway, MD
Edward B. Solomon, MD
Louis Zamvil, MD

Hospital Administration

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President

Sheldon S. King
Executive Vice-President and Director

James F. Silverman, MD
Chief of Staff

Philip G. Rector
Director, Facilities (SUMC)

David I. Sakai
Director, Finance

Donald R. Thomas
Director, Personnel

Mary Catherine Krawec
Associate Director

Donald G. Utt
Associate Director

Duane D. Walker, RN
Associate Director
Director, Nursing Service

William W. Arnold
Assistant Director

Ronald W. Hill
Assistant Director
Director, Health Services Planning

Nancy Madsen, RN
Assistant Director
Associate Director, Nursing Service

Carole Runyan Price
Assistant Director

Roland S. Merchant
Special Assistant to the
Executive Vice-President and Director

Karen M. Richards
Special Assistant to the
Executive Vice-President and Director

Jeanne D. Kennedy
Director, Community Relations

Department of Nursing Service

Duane D. Walker, RN, MS, FAAN, Director
Nancy O. Madsen, RN, MS, Associate Director

Nurse Recruitment	497-7330 or 497-7261
Office of Nursing Research	497-7811
Educational Services	497-5834 or 497-5058

Total employees

Registered nurses	1,324
LVNs/nursing assistants	312
Unit service assistants	194

Registered nurses by patient-care area

Medical/surgical	482
Critical care	346
Perinatal/pediatrics	301
Operating rooms	124
Emergency department	49
Psychiatry	22

Friends of Nursing

Leona Nealey, Chair

The Friends of Nursing are a group committed to excellence in nursing, to improving visibility of nursing as a component of health care, and to supporting professional nursing practice at Stanford University Medical Center.

For further information, write Friends of Nursing, Stanford University Hospital, Room C020, Stanford, California 94305; or call (415) 497-7980.

Licensed Medical Services

Basic Services: Anesthesia, Dietary, Laboratory, Medical, Nursing, Pharmacy, Radiology, Surgical

Supplemental Services: Acute Respiratory Care, Basic Emergency Medical, Cardiovascular Surgery, Chronic Dialysis, Coronary Care, Intensive Care/Newborn, Intensive Care, Nuclear Medicine, Occupational Therapy, Outpatient, Pediatric, Perinatal, Physical Therapy, Psychiatric, Radiation Therapy, Social Service, Speech Pathology

Licensed Beds

Intensive care and coronary care	65
Maternity	32
Medical/surgical	477
Newborn intensive care	25
Pediatrics	34
Pediatric intensive care	10
Psychiatric	20
Total	663

Additional Facilities

Well-baby nursery, bassinettes	32
Operating rooms	16

Average Day of Hospital Operations

Admissions	
Adult and pediatric	67
Newborn	9
Emergency room visits	74
Average daily census (excludes newborns)	485
Surgical procedures	46
Diagnostic radiology procedures	316
Radiation therapy treatments	95
Outpatient 94% Inpatient 6%	
Prescriptions filled (inpatient and outpatient)	1,600
Laboratory tests	3,800
Food service	
Patient trays	1,209
Cafeteria transactions	3,353

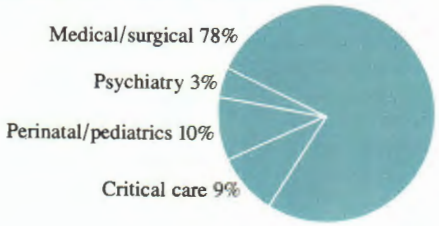
Patient Census

Year	Admissions*	Days of Care	Average Stay**
1960	9,770	129,671	13.3 days
1965	20,956	159,146	7.6 days
1970	23,001	187,069	8.1 days
1975	23,420	176,709	7.6 days
1981	24,698	182,482	7.4 days

**Excluding newborns.*
***Calculated according to AHA Uniform Definitions.*

Patient Days by Service

Adult and pediatric days: 173,501
Normal newborn days: 6,544
Newborn intensive care days: 8,981



Medical Staff and Hospital Personnel

Total medical staff	893
Total Hospital personnel (includes part-time)	4,310

House Staff*

Department	Interns & Residents
Anesthesia	36
Dermatology	15
Gynecology & Obstetrics	18
Internal Medicine	61
Neurology	14
Pathology	16
Pediatrics	43
Psychiatry	38
Radiology	38
Cardiovascular Surgery	7
Surgery	129
Total	415

**On rotation between Stanford Hospital and affiliated hospitals.*

Emergency Department

Patient census (1981)	26,567
Paramedics trained (1981)	59
Mobile Intensive Care Nurses trained (1981)	116
Cardiopulmonary Life Support trainees (1980/81)	
Basic cardiopulmonary life support	529
BCLS instructors	25
Advanced cardiopulmonary life support	300
ACLS instructors	16

Major Affiliated Teaching Hospitals

Children's Hospital at Stanford, Palo Alto
60 beds

Santa Clara Valley Medical Center, San Jose
641 beds

Veterans Administration Medical Center, Palo Alto
1,437 beds

Accreditation and Licensure

Accreditation
Joint Commission on Accreditation of Hospitals

Licensure
California State Department of Health Services

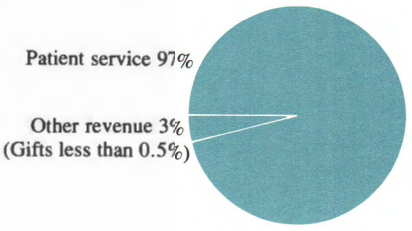
Memberships
American Hospital Association
California Hospital Association
Hospital Council of Northern California
Hospital Conference of Santa Clara County
Association of Western Hospitals
Council of Teaching Hospitals

Financial Facts of the Stanford University Hospital

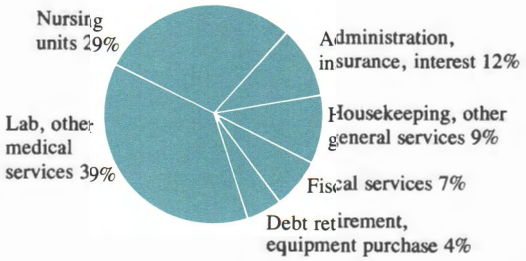
(Fiscal year ending August 31, 1981)

Total net revenue $129,044,000

Where Funds Came From



Where Funds Were Spent



STANFORD UNIVERSITY

Like other components of Stanford University, of which the Medical Center is an integral part, the ultimate legal responsibility for governance of the Medical Center rests with the Stanford University Board of Trustees.

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Linda Hawes Clever
Nelson G. Dong
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Vice-President for Business and Finance

Robert M. Rosenzweig
Vice-President for Public Affairs

Joel P. Smith
Vice-President for Development

Chancellor of the University
J.E. Wallace Sterling

Telephones

Hospital

Information	
Main Center Lobby	(415) 497-5428
Hoover Pavilion Lobby	497-6581
Patient Location & Telephone Numbers	497-5428 or 497-2300
Admitting	
Main Center	497-6221
Hoover Pavilion	497-5056
Emergency Department (24 hours)	497-5111
Patient Billing Information	
Medicare & Medi-Cal	497-6061
All other accounts	497-5621

Clinics

Registration	497-7271
Patient Services	497-6323
Billing Information	497-7651

Medical Center

Medical School Administration	497-5242
Development Office	497-5295
Medical News Bureau	497-6911
Alumni Office	497-5064
Public Events Office	497-6389
Other departments not listed	497-5028

All facts as of January 1, 1982, unless otherwise defined.

For additional copies, write or phone
Publications
Office of Medical Development
780 Welch Road, Suite 106
Palo Alto, California 94304
(415) 497-7603

Orig. date: 5/4/72
Revised: 10/28/77, 3/28/80
JL:jw

INFORMATION

intensive care unit

STANFORD UNIVERSITY HOSPITAL

STANFORD UNIVERSITY HOSPITAL
DEPARTMENT OF NURSING SERVICE

INTENSIVE CARE UNIT

Purpose:

The purpose of the ICU is to provide specialized 24-hour continuous bedside care for critically ill patients, and to provide personnel and facilities for the development of new techniques.

General Information:

The ICU's are divided into separate Units -- North ICU (Cardiovascular) and East ICU's (Medical and Surgical). Most of the rooms are semi-private rooms. The few private rooms that we have on the floor are used primarily for heart transplant patients or patients receiving special care. In its rooms, patients of all ages and both sexes can be found. There is a nurse to care for every one or two patients, 24 hours a day, as well as Charge Nurses and Ward Secretaries at each ICU desk.

The Patient Rooms:

Each room in ICU has modern, up-to-date equipment to monitor and assist the patient in his recovery in addition to necessary emergency equipment. The ICU has an intercom system which connects every patient room with the central desk. During your stay in ICU you will often hear the intercom system being used. Each patient's condition will govern how much and what equipment will be used. There are frequent room changes to facilitate nursing care.

As a patient, your blood pressure, pulses, respirations, and temperature will be taken frequently while in ICU. During your stay, there will be a nurse with you at all times and you will be asked to cooperate with her in your care as much as possible. The most important activities stressed are coughing, turning, deep breathing, and early ambulation.

As you recover, your activities will progress as the doctors permit. When you are transferred from the ICU, you will probably return to the intermediate intensive care unit (E2A) or the floor from which you came. If you need additional information, the nurse at the ICU desk will be happy to assist you. We thank you for your cooperation.

Visiting Regulations:

The immediate family of the patient (parents, spouse, siblings, and the children) are permitted to see the patient for a brief period of time upon return from surgery. Visitors must be 16 or older. Thereafter, the visiting hours are 15 minutes, four times a day. The visiting times are:

10:15 a.m. to 10:30 a.m.
1:15 p.m. to 1:30 p.m.
5:15 p.m. to 5:30 p.m.
7:45 p.m. to 8:00 p.m.

Due to the extensive needs of the patients, only two persons of the immediate family are permitted in the rooms at one time during visiting hours.

Telephone inquiries regarding a patient's condition may be made by the immediate family at any time of the day or night. Dial (415) 497-6081 for patients in the North ICU (Cardiovascular) Unit. If you do not know the room number, the Clerk at any of the extensions will be happy to assist you. Only a general condition report; i.e., critical, stable, good, and fair, will be given over the phone. There are no telephones in the patient rooms. Visitors may leave a message with the Ward Secretary if they wish to contact the doctors of the patient.

There is a lounge available for the convenience of visitors at the entrance to each ICU where there is an Information Desk, staffed by Auxilliary members. Volunteers are there to act as a liaison between the visitor and the ICU Charge Nurse. Do not leave valuables unattended in the lounge area. Patient's families can be contacted in the visitors lounge at (415) 497-5842.

Please do not bring small children to the ICU lounge. They are often distracting to the relatives of other patients.

The Cafeteria on the first floor is open to visitors except between the hours of 11:30 a.m. and 1:00 p.m. daily. There are also vending machines in the basement of the Hospital, with the exception of cigarette machines. No food is permitted in the lounge. In addition, there is a Gift Shop and a Chapel located on the first floor.

Personal Belongings

Due to limited space, patients are asked to bring only toothbrush and toothpaste, comb, brush, shaving equipment, dentures, glasses, hearing aids, robes and slippers. Hospital gowns will be provided.

Please send all other belongings home with family. Do not bring valuables or flowers while in ICU. A favorite toy or blanket is permitted for a child.

****

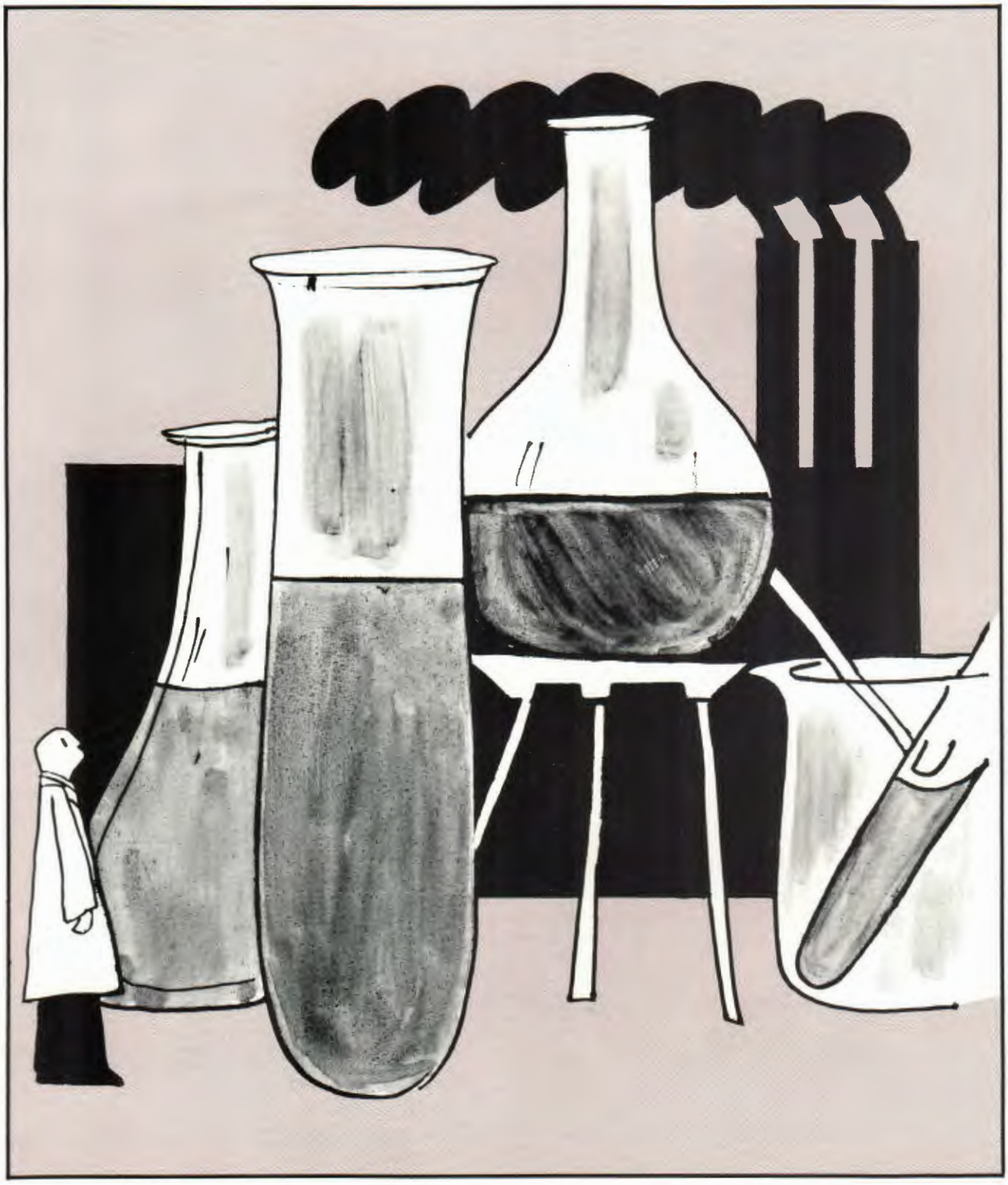
Telehpone Numbers

North ICU (415) 497-6081 - regarding patient's condition (by immediate family only)

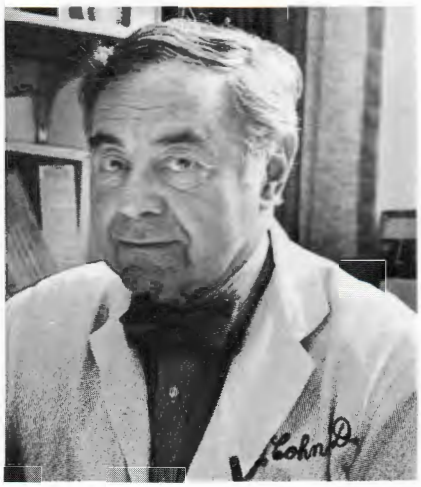
North ICU Waiting Room (415) 497-5842 - family members of patients in North ICU can be contacted here.

Stanford MD

Stanford Medical Alumni Association–Fall 1982



FROM THE PRESIDENT



As president of the Medical School's Alumni Association, I hope to be able to have some impact on the association's activities, as well as on alumni's general attitudes towards the association. There are a number of issues on which we need to focus.

Those of you who have attended the recent alumni days may have noticed that very few of the more recent graduates of the School attend. This is not due to the programs presented, which have been consistently excellent. Nor is it due to the number of classes graduated from the San Francisco campus as compared to the Stanford campus, which are about equal. The more recent graduates don't seem to have the sense of loyalty many of the San Francisco graduates display, or perhaps they aren't aware of what the association can do and does do for them.

One of my goals is to reverse this situation. The Alumni Board is already trying to do so by appointing more recent graduates as replacements to the Board.

A new directory, scheduled to be published next year, will include alumni, and associates, in order to facilitate communication between everyone who's experienced Stanford's Medical School in one way or another.

Also, the attitude questionnaire, which you hopefully have completed and returned to the alumni office, will dictate for a large part the association's future activities and directions. For the first time, you have the opportunity to tell the association exactly what you are thinking and what you, as a member, would like to gain.

The association is also increasing its involvement with future alumni–medical students. This spring, for example, the association will sponsor a musical production written and staged by students, housestaff, and faculty. The response to this has been tremendous, and the show promises to be great as well.

The production will revive an old tradition from the San Francisco days, which culminated in "The Clay Street Blues" revue, staged when the Medical School moved to the Stanford campus. Faculty, students, and alumni joined together–creating a sense of camaraderie that has lasted over the years. Perhaps this show will create the same type of atmosphere in future years.

Also, those of you attending the American College of Physicians meeting in San Francisco this spring should mark on your calendars a special cocktail reception for Stanford alumni. You'll receive more information in the near future. Hope to see you there!

Another issue that seems to be a bit confusing to some alumni is that of how your financial contributions are used. The Stanford University Board of Trustees long ago determined that the Medical School's Alumni Association, like most university alumni associations, would not be involved in direct fundraising. This was also in keeping with the desires of our Alumni Board. But there are various ways to give money to the School.

The association dues are currently used to finance the Stanford Medical Alumni Students Scholars Programs, which encourage medical students to do individual research while in school. They are used for special gifts, such as the $20,000 unrestricted gift we gave to Dean Dominick Purpura last spring, and for various loan and scholarship funds. Individual contributions to the association can be earmarked for loan funds, endowment funds, or unrestricted gifts. The dues do not pay for the association's activities; that money comes from the School.

Alumni can also contribute to the Medical Fund, designated for unrestricted gifts to be used according to the Dean's discretion; endowed scholarships; or financial assistance. In 1980-81, for example, alumni and associates gave $254,500 to the Medical Fund. We have also responded well to special events, such as the Kaiser Challenge. We raised enough money then to qualify for an additional $150,000 from the Henry J. Kaiser Family Foundation.

Continued and increased support is essential, especially in light of all the federal funding cutbacks for medical student financial aid.

If you have other issues you'd like to see discussed, write to us and let us know. After all, this is *your* association.

Roy B. Cohn, '33

Stanford MD

Stanford Medical Alumni Association–Fall 1982 / Volume 23, Number 1

Contents

STANFORD MD is published three times a year by the Stanford Medical Alumni Association, a nonprofit corporation organized in November, 1950. Opinions expressed by guest contributors do not necessarily reflect the views of the Association, its officers, governors, members, or agents. The publication is distributed to graduates of Stanford University School of Medicine and its predecessor, Cooper Medical College, and faculty and students. Membership in the Association is open to medical graduates of Cooper and Stanford University School of Medicine, and to past M.D. faculty members, interns, residents, fellows, and other postgraduate trainees who have completed one year of service at Stanford.
 Correspondence should be addressed to the Editor, Room TC135, Stanford University School of Medicine, Stanford, CA 94305.

"DO YOU, ACADEMIA, TAKE INDUSTRY...?"

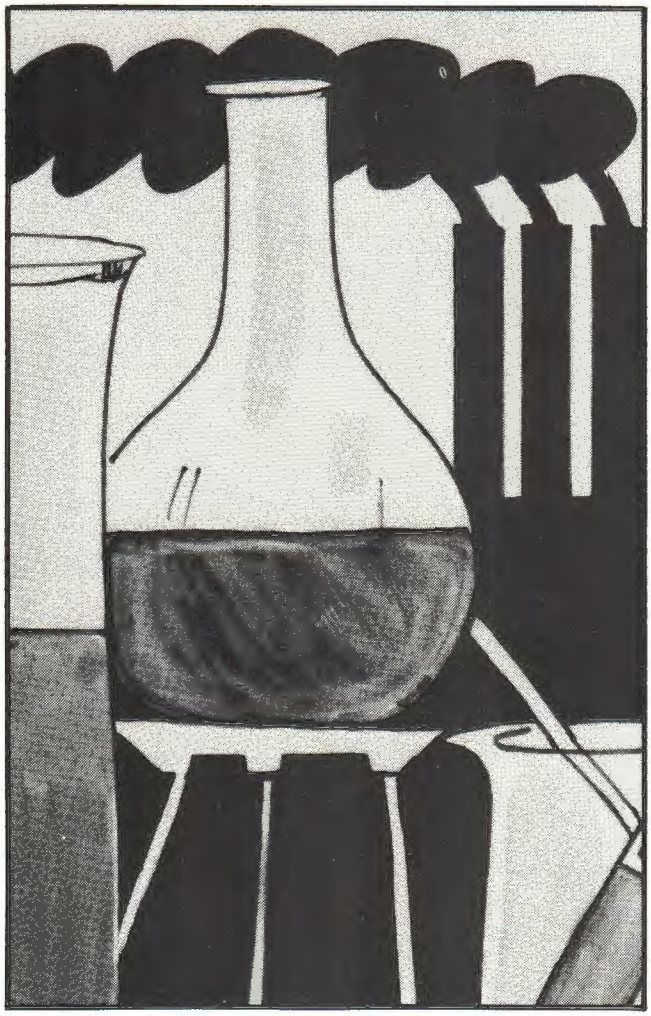
Two traditionally disparate institutions are collaborating to share knowledge, technology, and financing in ways both hope will be mutually beneficial. Potential conflicts of interest, however, are causing leaders in both areas to ask if the relationship is for better or for worse.

Genetic engineering. Biotechnology. The two terms are often used interchangeably. Biology and genetics are responsible for acquiring basic knowledge. Technology and engineering are responsible for applying the knowledge to solve practical problems. Put them together, and they revolutionize the scientific world.

Nonexistent 20 years ago, genetic engineering is now in its "golden age," according to Nobel Laureate Arthur Kornberg. Created by the confluence of biochemistry, genetics, microbiology, virology, and cell biology, its advent was never planned, nor anticipated. Yet it fascinates Wall Street, and preoccupies academia.

Said Kornberg in a recent speech, "Until recently, the news media and columnists were frightening their readers and listeners with predictions that DNA and new genetic techniques would create microbial monsters that would consume them. I routinely take a poll of airline stewardesses on cross-country flights. Two years ago, eight out of ten were aware of DNA, and believed it led to cloning people and big trouble. I was pleased by my latest poll. Now, only two out of ten stewardesses recognized DNA, and both had heard about it as a hot investment from their stockbrokers."

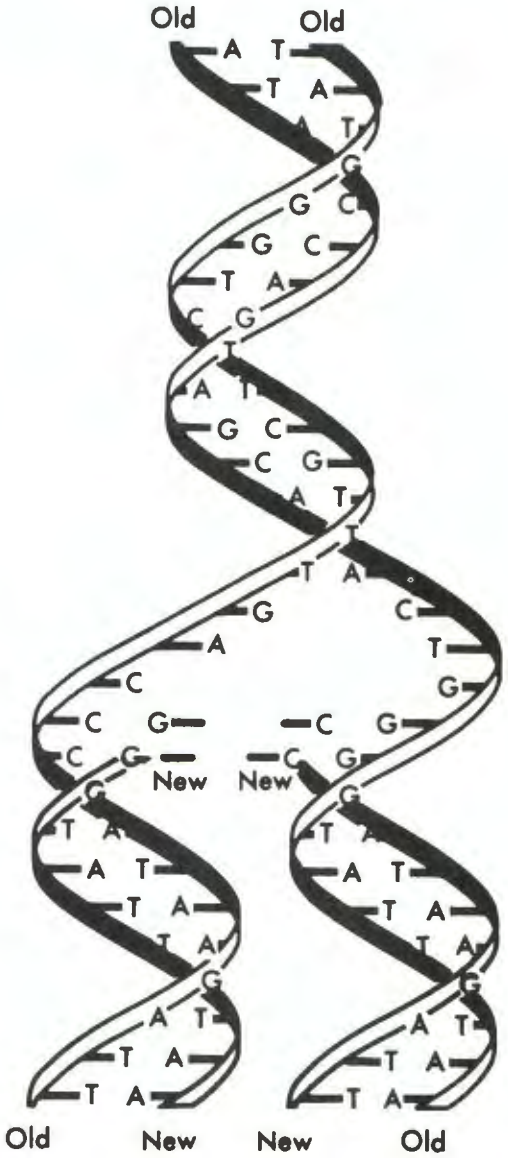
Why? Because genetic engineering is breathing new life into industry, giving them the knowledge to be able to produce marketable products such as growth hormone or insulin. That knowledge is coming from academic scientists, who because of federal cutbacks in research funding, are looking for new financial resources. Thus, industry and academia are entering into a mutual courtship. Their collaboration is unavoidable, but both parties are concerned about potential conflicts of interest and problems such collaboration entails. A number of the prevailing issues are discussed in these pages. First, a brief refresher about DNA and genetics. . . .



DNA: MOVING TOWARD A BASIC UNDERSTANDING OF CHROMOSOMES

The present genetic engineering advances will seem minor compared to what will come in a few years.

by Arthur Kornberg, M.D.



Forty years ago, there was no conception of the chemical basis of heredity. Genetics was expressed in abstract terms. Today, however, we know the precise formula and organization of DNA, the genes and chromosomes. We understand how DNA directs the functions, and embodies the genetic information of all living things. We analyze, synthesize, and rearrange the DNA to create new genes, new chromosomes, and new species.

To appreciate the dimensions of DNA and genes, imagine miniaturization at its extreme. Consider a 25-volume encyclopedia reduced to the size of a pinhead. Think of a dot at the end of a sentence of such a pin-head size encyclopedia. Finally, imagine an object one thousandth the size of this dot – this is the size of an atom. Atoms are the ultimate symbols in language miniaturization. They are letters of Nature's language, strung together in the form of DNA.

From a small virus whose head is artificially ruptured, the DNA streams out and looks like a very long fiber. This fiber, about a thousandth of an inch long, is the chromosome of the virus. It contains nearly 200 genes in a precise linear arrangement.

DNA has two main functions. One is to give instructions for building the proteins and enzymes that form and operate organisms. The genes direct the assembly of proteins, and proteins carry out the cellular activities. The chromosome with its many thousands of genes is the construction manual for the production of the many thousands of distinctive proteins of cells. Each

protein is encoded by a separate gene.

The second function is to give instructions and to provide a template for reproducing identical copies of itself. This reproduction, called replication, is how DNA serves in heredity.

Structurally, DNA is a chain of letters or nucleotides, called A, T, G, and C, for adenine, thymine, guanine, and cytosine. A bacterial chromosome is a circle of four million such letters; the human chromosome is a thousand times longer. DNA, as Watson and Crick showed in 1953, is made up of two such chains wound about each other in a double helix. They are linked by bonds between A and T, and between G and C. The essence of replication is for each of the DNA chains to serve as a template for assembling a new chain.

The bacterial DNA of four million letters is copied in 20 minutes. An incorrect letter is inserted less often than once in a hundred million times. More than 20 enzymes are important in replication. In the latest reconstruction of the process in a test tube, we see an enzyme that unzips the double helix, proteins that keep the separated chains apart, and an enzyme, DNA polymerase, that proofreads each insertion it makes and deletes any improper ones.

One of the major unsolved problems in biology today is how DNA replication is controlled in the cell. Why, for example, is DNA replication active in embryonic cells and cancer cells and restrained in adult normal cells? To understand this fundamental question, we need to advance much farther in our understanding of the enzymes responsible for DNA replication.

In learning about the genes and enzymes responsible for assembling and altering DNA, scientists developed genetic and biochemical techniques to rearrange genes and chromosomes. These techniques are called *genetic engineering*. By means of genetic engineering, sections of DNA, comprising one or several genes, can be separated, rearranged or "recombined," and then transferred from one cell to another. The *recombinant DNA*, transferred from one cell to another, changes the genetic makeup in a way that would not likely be achieved through natural processes.

"Imagine an object one thousandth the size of a dot at the end of a sentence of a pin-head sized encyclopedia. This is the size of an atom, which strung together with other atoms creates DNA."

The transfer of genetic sections is effected by incorporating them into "vectors" such as viruses or plasmids. Viruses are chromosomes, clusters of genes, enclosed in a protein shell. They reproduce only inside a cell. Plasmids are small circular clusters of genes resembling viruses in their capacity to multiply inside bacterial or animal cells. By genetic engineering we can insert foreign genes into a virus or plasmid.

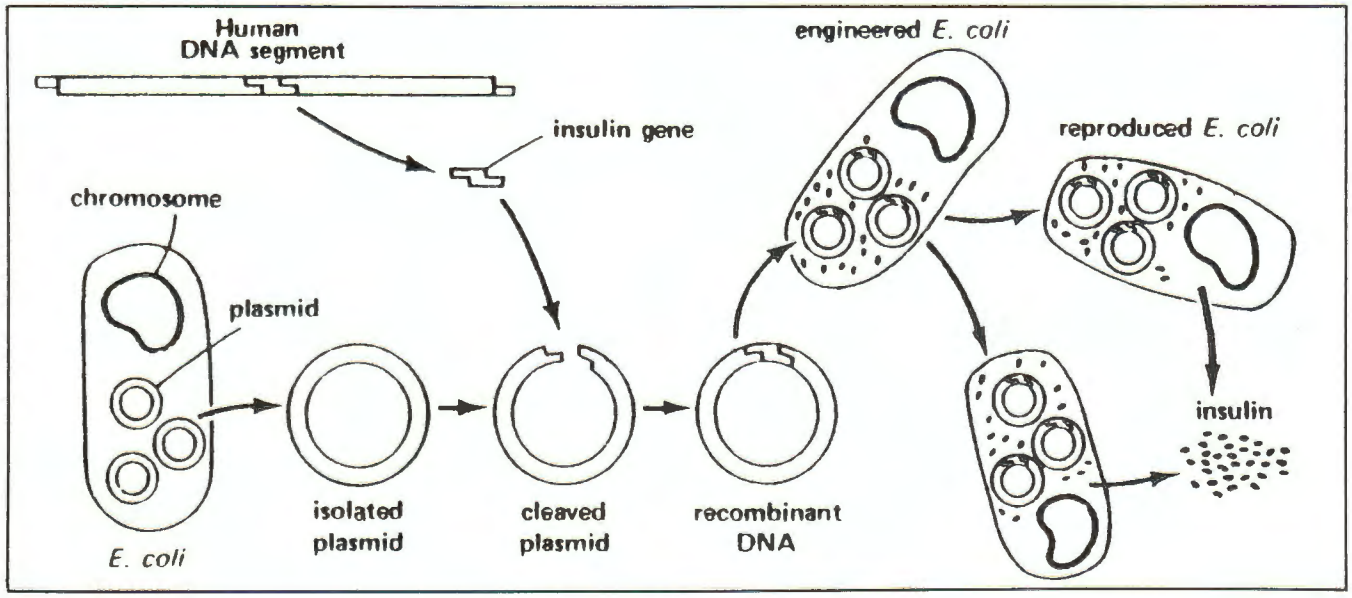
For example, we can insert the human gene coding for insulin into a certain plasmid from the common intestinal bacterium, *E. coli*. The modified plasmid is a recombinant DNA. When taken up by *E. coli*, this novel DNA molecule confers on these bacteria the unique capacity to manufacture human insulin.

As such, bacterial replication apparatus can reproduce human DNA and vice versa. DNA from any source can be interpreted and reproduced by every cell in nature. DNA is a universal language.

The ease with which bacteria can be turned into massive factories for producing pure and precious hormones and vaccines is astonishing. In the next few years, human proteins previously unknown or unavailable will most likely be produced by genetic engineering. These products will prevent or cure a number of major diseases. There is also reason to be optimistic about profound impacts of genetic engineering in the production of organic chemicals for industry and in the modification of plants to advance agriculture.

These are the bright prospects that have made genetic engineering stocks the glamour issues of Wall Street. Yet even if these spectacular prospects are realized, they will seem minor compared to what will come in a few years from a basic understanding of the structure and function of chromosomes.

Dr. Kornberg, Emma Pfeiffer Merner Professor of Medical Science, received the Nobel Prize in 1959 for his work synthesizing DNA in a test tube.



Lobby to preserve federal support of basic research

by Arthur Kornberg, M.D.

There is no doubt that the revolutionary confluence of the medical sciences leading to developments such as genetic engineering was made possible by the massive federal grants programs of the NIH and NSF in the postwar period. There is also no doubt that the continual retrenchment of research support by these agencies in recent years has seriously blunted scientific progress. The Administration budget for the NIH for Fiscal Year 1983 reduces by 20 percent the number of new and competing renewal grants, by 10 percent the reimbursement to institutions for indirect costs and by 17 percent the number of research trainees. There will simply be far fewer research efforts and those that are made, even by the most talented, will be less innovative and adventurous.

One often hears that private philanthropy and corporate contributions will fill the gap left by reduced federal support. This is utter nonsense. We're talking about billions of dollars a year. There just aren't such resources available nor are there equitable mechanisms for obtaining and distributing such sums except through federal taxation and administration.

Let us consider for a moment the corporate support of basic academic research. There is a widespread feeling that the biotechnology companies, having obtained their science and scientists from the universities, should share their fortunes with their academic parents and benefactors. To begin with, most of these fortunes are more fancied than real, and the imperative to share them is not all that persuasive. Surely the universities would not wish to share the losses suffered by any of these bold corporate ventures should they fail.

To put it bluntly, there aren't that many rich biotechnology companies; few of the successful enterprises are able or inclined to give their money away; and if such a rare one exists, it will surely not pour millions of dollars into an abstruse project with a 20-year gestation period.

I see only one solution for the support of basic research: mobilize to preserve and enlarge the federal programs that support it. The massive support by our federal government for the past 30 years has proven in the most compelling way that large sums of money can be distributed wisely and without chicanery by Washington, that the talent is available to make astonishing progress with these resources, and in an utterly practical way, expensive though research may be, it's a bargain compared to the cost of disease.

Mobilization to obtain an appropriate slice of the federal budget is of course a political problem. We must convince the electorate, Congress, and the Administration of the vital importance of investing in the training of scientists and supporting the research of those who are highly competent and motivated. To do this we must lobby and lobby hard. Lobbying is nothing of which to be ashamed. It is an essential ingredient of the American political process. The problem is that we are starting late in the day in competing with lobbies that are keen, experienced, resourceful, and command large constituencies.

Who will do the lobbying? There must be a partnership between academia and the biotechnology industry, including the medical industry. In urging a partnership for a massive and sustained lobbying effort for basic science support, I must warn my corporate and medical friends to expect little from our academic colleagues. Their record and attitudes are dismal and embarrassing. For example, when Professor John Smith hears that his colleague Joe Brown has just had his research grant cut off, he's likely to say, "Thank God I've still got a year left to go on my grant." A scientist warned of a fire down the hall is likely to keep on working until the flames reach his door.

A review of the origin of biotechnology shows that it came from basic studies with no design or intention for industrial application. Although technology and biology are often intertwined and symbiotic, realization of the great potential of biotechnology rests on preserving the identity and strength of the basic biologic sciences. We must emphasize that it took a century of basic research in physics, chemistry, and biology to create biotechnology and the medical sciences that now can be merged into a confluent discipline expressed in the common language of chemistry.

I will continue to plead for the organization of an effective lobby for federal support of basic science. It is too important and too complex a project to be left to politically inept scientists. The biotechnology and the medical industry, which includes you and me, must lead the efforts. The support is so vital to our future that it must be the responsibility of society.

THE UNIVERSITY CHALLENGE

Institutions must find the way to increase industrial support of research without compromising commitments to scholarship and learning.

by Lawrence G. Crowley, M.D.

"The motive force of industry is profit; the mode is secrecy and proprietary control of information and the fruits of research. The motive force of universities is the pursuit of knowledge; the mode is open exchange of ideas and unrestricted publication of the results of research."

Industry sponsorship of basic and applied research and development amounts to less than four percent of current university research support. Yet suddenly, it looms as an important topic on the horizon. Universities are interested in industry support in order to facilitate transferring technology to contribute to improving society's health and productivity. Universities and their faculties have an ulterior motive as well: they are feeling financial pressures, and industry represents a potential alternative source of support. The dilemma lies in whether they can increase support from industrial sponsors, without subverting their commitments to scholarship and learning.

The term "research and development" covers a broad spectrum of activities ranging from the initial thoughts of a theoretical physicist to the testing of an over-the-counter product before it is marketed. In biomedical sciences, basic or fundamental research can be described as a process of exploring fundamental questions without a precise goal. Applied or clinical research, however, is directed to the solution of a practical problem after sufficient basic information has become available. The outcome is more predictable than that of basic research. Development involves the actual manufacture of prototypes and their testing.

Universities' primary interest and successful experience has been in basic research. Industry, on the other hand, has been almost exclusively involved in development. Both have participated in applied research. For example, initial new drug and medical apparatus test-

ing on non-humans is frequently done in industry, while efficacy and safety evaluations in patients have progressively become the responsibility of university hospitals and medical school faculties. This raises an ethical issue—that of clinicians' responsibility to their patients.

Communication and collaboration between industry and universities in applied and clinical research have been existent for a long time. However, industry has supplied only a minor portion of overall research funding for this purpose. Most of the funding has come from the federal government. The National Institutes of Health (NIH) and the National Science Foundation (NSF) have been the primary supporters. Since 1950, government support for basic research in industry itself has grown almost twice as fast as industry support of its own research. More important, government support of university research has grown four times as fast as industry's contribution to that effort.

A bewildering array of technological advances has emerged from this investment. Where ultimate technologies, such as polio vaccine, have been introduced, major cost reductions and profound changes in health status have followed. Where no biological answer has yet been discovered, as with cancer or coronary artery disease, expensive technologies such as cobalt therapy or coronary care units have been developed with less clear results. University biomedical scientists have played a key role in the discovery of new technologies, and have had a subsidiary role in the actual product development. Industry scientists carried it out, with faculty scientists serving as consultants when needed.

"Industry is interested in academia because it needs the brain power concentrated in universities to speedily develop new technology and manufacture products with great potential for commercial success."

This interaction has gained importance in light of the new technologies of genetic engineering and hybridomas, with which the traditional university-industry ties are changing.

The two technologies emanated entirely from federally funded basic research in academic laboratories. Until about five years ago, industry had virtually no interest in molecular biology or immunogenetics. Suddenly, however, it saw opportunities for good and profit in these fields, and has been attempting to catch up. The only places where scientists with relevant skills in genetic engineering and hybridoma technology are available, however, are in universities. Industry has been deluging campuses with tempting commercial offers, increasing the pressures on academic scientists. Industry is interested in academia because it needs the brain power concentrated in universities to speedily develop a new technology and manufacture products with great potential for commercial success, at least until it can build and staff its own cadre or sell out to a larger company. Industry needs access to universities for continuing education of its scientific and technical staff, as well as inside access to the pool of the brightest graduate students.

The problem, of course, is whether university-industry relationships will magically prove comprehensible in structure, yielding and flexible in attitude, and tractable and conciliatory in negotiations.

Universities' concerns are based on the differing goals of academia and industry. The motive force of industry is profit; the mode is secrecy and proprietary control of information and the fruits of research. The motive force of universities is the pursuit of knowledge; the mode is open exchange of ideas and unrestricted publication of the results of research. Universities are interested in returning some portion of the value their professors create in order to nourish academic needs. The most important of the involved parties, the faculty member, is also interested in increasing his interactions with industry to see the final payoff of his basic discovery. The biomedical scientist who discovers a new compound or synthesizes a naturally occurring protein wants to see it produced in

quantity valuable to disease prevention or treatment. The scientist also wants some financial rewards, especially when academic salaries are relatively low.

Universities are seeking funds to support their basic programs of teaching and research, which are becoming progressively more expensive and heavily dependent on sophisticated facilities and equipment. The programs require direct support for faculty and staff conducting research, and indirect support for the universities' basic operations. Alternate financial support resources are sought because of significant research funding cutbacks from NIH and NSF – a trend that is expected to continue. They must also be aware that with the increasing competition for research manpower between academia and industry, some of the best and most promising young scientists may choose industry. The ensuing loss of momentum in basic and applied research should be avoided; it would be a loss to society in the long run.

Universities should be fair and equitable with their faculties, and should promote turning valuable technologies into human services, but not at the expense of placing the return of monetary rewards ahead of the obligation to act in the public interest, nor at the expense of compromising their independence in determining policies and programs.

Universities face the greatest risks by entering into relationships with industry. The basic mission of universities are discovery and dissemination of knowledge and, in the case of academic medical centers, delivery of the most advanced medical care. The university's value to society is the ability to continue discovering new knowledge, and to educate and train highly competent ethical leaders in the affairs of science, arts, and commerce. The university's vision is like the vision of older people – farsighted. It is concerned with the education of students who will develop ideas that will survive a long time. Traditionally, universities have not been concerned with shiny new products of short-term value or with quick returns on investments. Processes preserving these values include the openness of inquiry and reporting of results, the almost total lack of secrecy, and the tradition of rigorous training and strict objectivity in the area of graduate education and training. Faculty members can pursue the most challenging problem rather than one with patent potential or commercial value.

Universities are seeing more and more resources earmarked for narrow projects with specific and often early-performance strings attached. Significant numbers of faculty are lured by illusions of money and fame, spending more and more time and energy on private research and development activities outside universities, or trying to combine inside and outside research. Continuing in this manner, basic research is destined to take a second berth, and graduate student education would suffer considerably.

"Until about five years ago, industry had no interest in molecular biology or immunogenetics. Suddenly, however, it saw opportunities for good and profit, and has been attempting to catch up."

Most importantly, the credibility of science and of universities could be seriously undermined if the public perceives that the search for truth is unduly tainted or accompanied by the search for gold. Universities have traditionally provided assurances that their primary concerns when considering new sources of funding are the qualilty of education, research, and academic freedom. Taxpayers' willingness to support university research as generously as in the past thirty-five years is based upon faith that the return on public investment will benefit all of society. It would be dangerous to allow that faith to be seriously questioned.

There is nothing inherently wrong with improved university/industry communication and collaboration and support of the former by the latter. Universities need not be intimidated by risks. But such relationships with industry should be arranged to maximize the opportunity and to minimize the risk for both parties and society in general.

No formula exists to accomplish this. The following principles, however, offer some basic guidelines.

- Universities' important missions of discovery and dissemination of knowledge, and delivery of the highest quality of patient care should be upheld as the primary considerations.
- All agreements between universities and industry should be publically disclosed to the fullest extent. Such disclosure will aid in preventing the development of conflicts of interest and the transfer of power too far to one side.
- Industry should be encouraged to invest a significant amount of relatively unrestricted research and development money to universities to support basic programs and to ensure the essential flow of new ideas, and the training of bright young people.
- Patent and technology licensing arrangements rewarding individual faculty members and their departments in an appropriate manner, and with fair but firm guidelines for faculty participation in outside industrial research activities, should be established.
- Faculty should be counselled to avoid high risk, high demand equity and management involvement in emerging companies, as well as overlapping industrial involvement with university research and graduate education activities.
- With the high potential for conflict of interest and distortion of graduate education, generous leaves of absence should be provided for faculty members, enabling them to spend time on outside activities without anxiety of conflicts of interest or distortion of graduate education.

In addition, human use committees should continue to be supported within university hospitals to ensure the special responsibility clinical research has as the guardian of the health and safety of human beings. Although time-consuming, these committees have been effective in protecting patients' welfare in addition to improving the quality of clinical research proposals. These committees should not only review proposals, but should periodically audit the outcome of these studies.

Also, medical centers should establish standing bioethics committees, concerned with the ethics of the medical centers' overall research activities. Not only fraud and abuse would be addressed, but also the issue of human use and potential conflicts of interest. In this manner, universities, industry, and society can achieve the benefits from relationships between academia and industry.

Dr. Crowley is vice president for medical affairs. His article is excerpted from a speech he gave recently at the dedication of the new Yale University Hospital at New Haven, Conn.

Curriculum lacks medicine's advances

by Arthur Kornberg, M.D.

Preclinical medical school curricula used to consist of seven discrete subjects: gross anatomy, microscopic anatomy, biochemistry, physiology, pharmacology, bacteriology, and pathology. Each of these subjects was taught by separate, sharply defined departments.

Today, the boundaries between the disciplines have vanished. Advances in medical science, such as the development of genetic engineering, have led to enormous changes and dislocations accompanying the confluence of so many divergent disciplines and departments. These changes have created serious problems on institutional, national, and individual levels.

Medical schools and universities, such as Stanford, have departmental divisions dating back 40 years. Most of these departmental lines are no longer meaningful, but schools insist on preserving them. While DNA is awesome and inspiring in its capacity for flexibility, rearrangement, repair, and evolution, the rigidity of social polymers–departments–is dismaying. Their longevity and resistance to change have an almost geologic dimension.

Not only has the coalescence of basic medical sciences made the old distinctions between biochemistry, physiology, pharmacology, anatomy, bacteriology, and pathology meaningless, but newer disciplines have emerged and are not adequately represented. Genetics, molecular biology, cell biology, neurobiology, and biophysics are struggling for a place in curricula.

Paradoxically, in the few instances when innovative responses have been made in departmental organization, particularly in medical schools, some of the consequences have been unfortunate. Elimination of a department by a merger, for example, is generally not matched by creation of a new department. Despite the expansion of knowledge and opportunities in the basic aspects of medical science in the past 40 years, the increase in the size of the preclinical faculties has been at best, modest.

Even with the creation of new departments of genetics, neurobiology, and structural biology at Stanford, there is still an imbalance in departmental and faculty representation between preclinical and clinical disciplines. It is a serious matter, affecting the distribution of space, money, and curricular emphasis, the location of administrative authority, the determination of policy, goals, and standards, and the awkward relationship to other schools in the University that fear the medical school colossus. Ironically, the success of basic medical science in recent years has been rewarded by a lessening of its influence in the power structure of medical education and practice.

Beyond the institution, problems of national scope exist. The explosive developments of genetic engineering have generated confrontations between academia and industry. The earliest industrial applications of genetic chemistry and immunobiology have come exclusively from academic laboratories. Understandably, the scientists, departments, and universities that provide the ideas, reagents, techniques, machines, and practitioners of genetic chemistry are reluctant to be excluded from its financial rewards by entrepreneurs and venture capitalists.

Obviously there are dangers if universities, as nonprofit organizations, become entrepreneurial and employ faculty for both academic and commercial performance. The possibility of genetic engineering companies appropriating a generation of senior scientists as consultants and junior scientists as employees, sealing them off from free exchange of new knowledge, presents major dangers as well.

Finally, consider the individual scientists, watching the changes genetic engineering and other developments are imposing on their field. Just like laymen, scientists are commonly confused by the distincton between science and technology. While technology advances science and may on occasion inspire a basic discovery, it is important to remember that technology rests on a foundation of science. This scientific base is often obscured and ignored when refinements in technology, heaped upon one another, make it seem that the marketed product is more important than the knowledge that fathered it. Scientists must determine how to cope with a sudden and increasing public awareness and conern about their scientific activities.

While doing so, they must consider it their responsibility to do the most creative and dedicated research within their power, and to report the results honestly, promptly, and unstintingly. Scientists should also, as conscientious citizens in a democratic society, participate in the discussions and actions of scientific and social communities.

A scientist's responsibilities do not, however, require choosing research of clear social or economic value, nor effecting the transfer of research findings to technology that will benefit mankind. Few scientists have the talent to do applied research that bridges the gap between science and technology.

The advent of genetic engineering is causing major concerns, and is one of the hottest topics in medical science today. There is no putting the jinni back in the bottle though. Scientists have been promising applications of genetic chemistry and immunobiology for many years. Now that they are within reach, they cannot be circumscribed or blunted. Despite the irritation or envy one might have about the unfairness of the financial windfalls, the recent commercial success of basic molecular and cellular biology has created many attractive jobs in an area where opportunities had become scarce. Commercial success has also secured a respectability for basic biologic science among the general public and government officials–a stature that dominance of the Nobel Prize awards could never achieve.

Solutions to the difficult problems that have been created cannot come from summit conferences, lawyers, or government agents. Institutions must be willing to change, in order to reflect the overall scope of medical science. Scientists, who are the major resource of these commercial efforts, must have the character and the wisdom to preserve academic standards and combat pressures for secrecy and gimmickry. Companies can succeed by working and communicating in a free and open academic manner. In so doing, they will attract the best scientists and thereby have the most important ingredient for success.

MEDICINE MEETS THE CHALLENGE

University/industry relationships are chaperoned through the Department of Medicine's Institute of Biological and Clinical Investigation.

by Kenneth L. Melmon, M.D.

Members of academia and industry do not always agree on whether one has a lot to offer the other. Realizing that any institution depending heavily on public support has a responsibility to serve society's needs however, the transfer of academic observations into industrial products is desirable. The regulatory requirements for new projects demand techniques and financing that are not and should not be found in the academic environment. Yet it is plausible that an association could be developed that would simultaneously enhance academia's principal goals while sharing basic knowledge. Following through this line of reasoning, Stanford Medical School's Department of Medicine established the Institute of Biological and Clinical Investigation.

As chairman of the Department, my colleagues and I realized that such an association would have a number of potential drawbacks. But, we also knew that present funding sources would be insufficient to assure newly recruited young faculty a secure footing in their early years of research. This meant that those highly qualified for an academic life would either not come to Stanford, or, would find all aspects of academic medicine unattractive.

On the other hand, we realized the relationship could have positive academic benefits. We based it on a very broad consultive level, reasoning that industry had only identified select individuals from time to time to help them with very highly defined problems. Industry rarely analyzes carefully the developing edges of biology in relation to the industry's particular product lines and scientific strength; thus most consultations were related to the fine tuning of a product that had already been discovered.

Because prior industry association with academia had been limited, we suspected that industry might be unable to identify the best combination of academicians to solve identifiable problems or explore the areas of biology that could eventually be applied to new products. If we could develop a long term, very responsible research strategy and joint planning of activity, confidence between the two parties would develop. More important, interest in fundamental university-based research projects with no *obvious* product-connection might eventually be funded by industry. We believed we could prove–as we have–that patent and licensing agreements were feasible without delaying publication or products. And, some projects acceptable to both groups could be carried out more economically in academia than industry.

All but one faculty member volunteered a maximum of 15 percent (eight days per year) of their total available consultive days, promising to make the research strategy planning activity a priority. Faculty who had been at Stanford for less than three years–for whose early work we sought funding–were not allowed to participate in the scheme. Such exclusion, we thought, would prevent one conflict of interest. We asked industry for a direct contribution to the Institute, based on the number of days of consultation the industry sought. These funds were used exclusively for research by the newer faculty members. The money was allocated on the basis of a grant application subjected to the same level of peer review as that used by the National Institutes of Health. The reviewers were senior faculty members, who were ineligible for the use of these funds. Again, this avoided a conflict of interest.

Those consulting received half of their ordinary consultation fee, arbitrarily defined as $500 per day to prevent incentive for consultation and to lower initial resistance to consult or ask for consultation. Aside from not exceeding the limit of eight consulting days each year, the consultants could not share in the funds contributed to the Institute. But, if in the course of consultation, industry became interested in fundamental investigation that could be done at Stanford, such research could be funded by industry on condition it was accepted as high quality fundamental research by a peer review committee composed of selected in-house and outside consultants.

The plan was implemented in December 1980. We succeeded in avoiding the liabilities we forsaw, but were faced with several problems that arose with the university in the course of reaching agreement on our program.

It took about two years to develop and consolidate the association, which was exceedingly slow. Communication was a major problem. The university, industry, and most members of the department were suspicious of the plan. Industry thought, in this situation as in others, that we were looking for a handout. They did not want to become a patron of fundamental research. After waiting for such a long time for academia to come to it, industry was often haughty and arrogant, unimpressed with our academic talent and our ability to deal with industry problems. Its representatives could not visualize the difference between an *ad hoc* relationship and our plans for custom tailored, long term, responsible research strategy. We had to convince them that we were not looking for a handout, that we did have skills to offer, and that we were not competing for their limited research budgets.

We also had to convince the Medical School and University that we were not sacrificing ourselves on the altar of "easy dollars," compromising the School's reputation and lowering research standards.

"We had to convince the Medical School and University that we were not sacrificing ourselves on the altar of 'easy dollars,' compromising the School's reputation and lowering research standards."

We tried out the program with two industrial groups: Syntex and Hewlett Packard. The Syntex agreement, for example, resulted in five major and two minor conferences. They have taken place in one year, requiring a total of 47 faculty consultative days. The two agreements currently provide approximately $600,000 per year to the Institute.

In essence, the structure of the Institute prevented creating dual classes of "citizenship" among faculty, while preserving all our academic goals. Voluntary participation after open discussion throughout the entire University made it possible to expand the plan to any and all departments of the School. Peer review precluded a decrease in the standard of the work to be done. Using the contribution for newer faculty preserved our capacity to attract young faculty and increased the incentive for senior faculty to partake in effective consultive activity. Peer review of work stemming from consultation obviated the possibility of impairing government funded projects, skewing graduate student training, or leading to the dominance of a profit motive. Overall, the successful use of funds actually enhanced fundamental investigation in the department while increasing industry's appreciation of it.

We found unanticipated positive results as well. The faculty has become excited realizing they are in a position to influence the transfer of workable projects to industry without extensive involvement of their own time, and as they pragmatically generate useful extensions of each other's work. A number of projects undertaken by industry would never have been worked on by the faculty because the projects lacked the requisite academic content. Yet faculty members find the transfer of their work to products quite satisfying, and responsive to what society believes academic scientists are trying to do for it.

Many have wondered whether government grants or the department's clinical activities were adversely affected because we had spent so much effort on these development projects, which only provide 4.5 percent of the total departmental research and training budget. In fact, our activities generating a relationship with industry and the community have been accompanied by an enhancement of other programs that are unquestionably appropriate in an academic institution. We are not, of course, implying a cause and effect relationship.

We have also realized that we can only work with a small number of companies without distorting our academic programs. It follows that the income generated by this type of activity is never likely to exceed ten percent of the budget required for research that the department must obtain to survive in ways for which it has become known. Hence, the impetus to over-commit to industry and thereby distort our academic program is very small.

We believe much depends on the maintenance of a balance of the approaches described above with entrepreneurial demands. But, we make no prediction as to how well that balance will be maintained. Neither can we comment on the stability and longevity of the association. We continue to be aware that the academic program depends on appropriate funding and for now have found a way to contribute to it usefully. The morale of the faculty group is high, as are its concerns. It is quite possible for us as academic scientists to meet and collaborate with industry. But even though it is sensible to plan a long life together, it is quite inappropriate for the two parties to marry.

Dr. Melmon is chairman of the Medical School's department of medicine, and Arthur L. Bloomfield Professor.

WILL MEDICINE BECOME A RICH MAN'S GAME?

Federal funding cutbacks have students rummaging for alternative sources of financial support. Meanwhile, administrators fear the lack of aid may decrease the diversity of future physicians.

by Shirley Kraus

Michael Laufer is worried. A third-year medical student at Stanford University School of Medicine, he had arranged to get a research grant for this summer. The grant would have given him remitted tuition benefits, enabling him to enroll for some classes without cost. But the funding fell through, and Laufer spent the summer working odd jobs, barely making enough to scrape by.

Laufer's savings, which he earned working as an engineer prior to entering medical school, are depleted. He receives the maximum amount of money from various grants to pay for his education. Yet he finds himself relying increasingly on loans to be able to meet his financial needs. Low-interest loans came through for him at the last moment this year. They had been delayed because of uncertainty of available federal funds. Next year, however, Laufer says he doesn't think those loans will be available.

Laufer could have graduated in four years, but opted for five so he could work during school. By doing so, he hopes to keep the amount of his debts as low as possible. Not only will financial obstacles keep Laufer from graduating on time, but they may in fact influence his entire career, forcing him to choose a specialty that pays more or requires less training so he can pay back his loans. "It's pretty depressing," Laufer admits. "I deal with money problems on a crisis basis – facing them only when I'm forced to."

Laufer is not the only one worried. More than 80 percent of Stanford's medical students receive at least some financial assistance. Proposed federal legislation may result in a 50 percent decrease in available low-interest funding for student loans, according to the School's financial aid administrators. In order to pay for spiraling living and educational expenses, budgeted at $20,000 this year, students are finding it necessary to consider alternative financing methods. More and more are finding themselves with no other options but high-interest loans. Their parents' contributions account for an increasingly larger share of the total budget. Students and administrators alike fear that the number of applicants to medical school – at Stanford and elsewhere – will decrease. Those who do apply and attend will most likely be from a more homogeneous segment of society.

"Students and administrators alike fear that the number of applicants to medical school will decrease. Those who attend will most likely be from a homegeneous segment of society."

"The impact of the cutbacks will decrease the diversity of our classes," predicts Dr. John P. Steward, associate dean of student affairs. "We worry that medicine may revert to being a profession that is the privilege of the well-to-do."

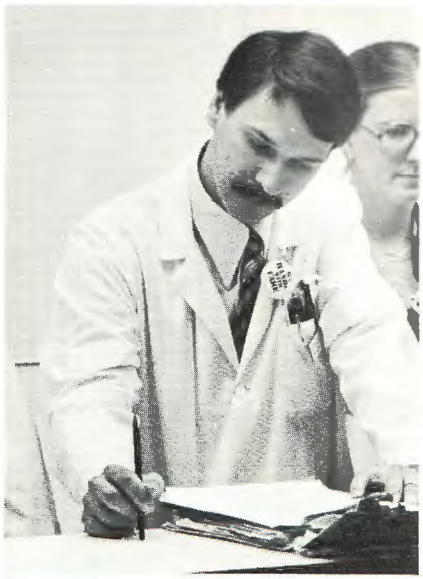
There is some evidence this may already be happening, says Katherine Kraus, financial aid administrator. She estimates the current first-year class parents are being expected to contribute 60 percent more than did last year's first-year class parents. Because students who are not U.S. citizens or permanent residents are ineligible for federal loan funds, new admission policies require foreign students to deposit in a local bank enough money to cover four years' worth of expenses. At current rates, this amounts to about $80,000. And Dr. Roy Maffly, director of admissions, estimates that three-quarters of those applicants who were accepted for the 1982-83 school year, and decided not to come to Stanford, based their decisions on financial reasons.

This particularly concerns Stanford, Steward says, which consistently has one of the highest percentages of minority and disadvantaged students in its classes. "About 20-25 percent of our students are from minority and disadvantaged backgrounds," he notes, "which puts an extra heavy burden on our financial aid programs. And with the School's goal of producing academicians and researchers, which are among the least paid in the field, we must provide enough aid to allow students to pursue these areas." But, he stresses, "this school is strongly dedicated to keeping its diversity. We'll do everything within our capabilities to include students from all backgrounds, and to encourage them to pursue careers in academia and research."

With this objective, the School takes

Gary Schwartz

Cliff Greyson



Michael Laufer

as big an interest in students' financial situations as in their education. Upon students' acceptance, Kraus and her colleague, Stuart Rosse, calculate how much parents are able to contribute, whether or not the student is independent. First-year students are expected to contribute at least $700 from summer jobs, savings, or other sources. Kraus and Rosse subtract these contributions from the individual budget to determine the students' needs.

Students are expected to borrow at least $3,000 per quarter for a minimum of $12,000 per year. As of now, the main loan sources include National Direct Student Loan (NDSL), at five percent interest; Guaranteed Student Loan (GSL), and Health Professions Student Loan (HPSL), at nine percent interest; and Auxiliary Loan to Assist Students (ALAS), at 12 percent interest. Stanford also issues loans at up to 10 percent interest. Unfortunately, except for Stanford's loans, these sources are under the federal axe. New HPSL and NDSL allocations are unlikely, Kraus says. And GSL, which provided about $1.5 of $2 million borrowed last year, is a "yearly fight to keep." Formerly available to anyone, the government instituted a needs analysis system in 1981, making GSL eligibility much more difficult. Other loans, such as Health Education Assistance Loan (HEAL), are more readily available. But with interest rates at three and one half points above treasury bill rates, students understandably try to avoid them.

Once students take out the required amount of loans, additional money – up to $2,000 per quarter – is available in cases of legitimate need from Medical School grants. Financial gifts are solicited primarily by the Office of Medical Development. Of nearly $23 million received by the School in 1980-81, for example, – of which medical alumni and associates gave about $254,500 – about $1.5 million was earmarked for student aid, according to Sally Agle, deputy director of the Office. Unrestricted gifts are ordinarily not used for financial support. However, a report prepared by the Office of Student Affairs warns that this year the reserve of financial aid funds will begin to be depleted. It also states that by the 1984-85 school year, in order to maintain the current level of assistance, money allocated to general operating budgets will most likely need to be used for financial aid. Stanford is the only one of its 13-medical school consortium that has yet to take this step.

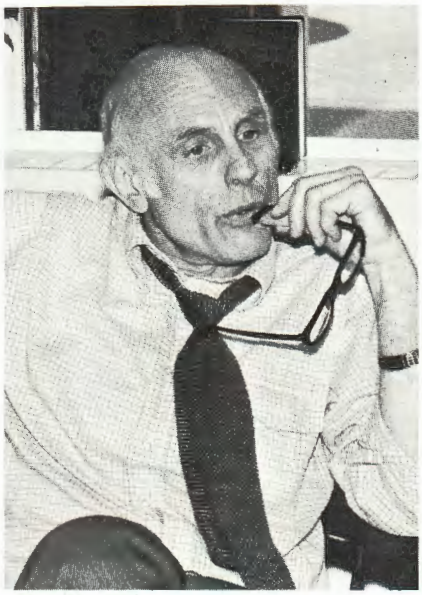
"We've saved the reserves for a 'rainy day,' and this is it," Steward says. "Our financial aid programs are okay for a while, but truthfully, we aren't sure what will happen after the next couple of years."

"Luckily, we've had the foresight to plan ahead," Agle adds. "In recent years the emphasis for gifts has been increasingly for student financial aid. Private support is the main source of financial aid obtained through the Development Office. Until other sources can be identified, it is essential that individuals, such as alumni, realize the importance and necessity of their contributions."

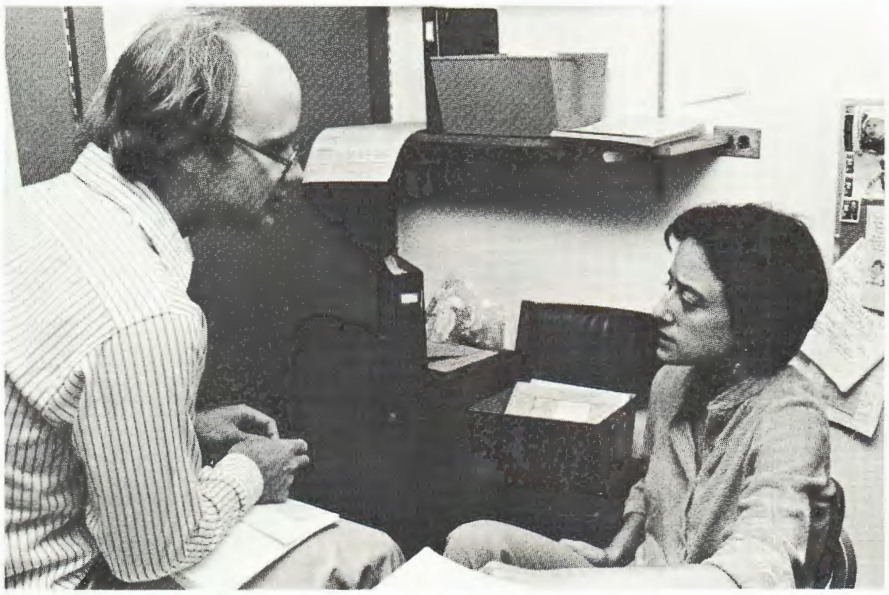
"The problem," explains Laufer, who represents Stanford's medical students in the American Medical Association and the American Association of Medical Colleges, "is that the federal government perceives medical students as having a big earning potential, and not in need of as much aid as other students. What they don't realize is that throughout internships and residencies, medical students are working 60-100 hours a week for relatively low wages."

Most students graduating now have about $20,000-30,000 worth of debts, surveys show. Even with low-interest loans, payback estimates are about $500 per month. The average housestaff salaries this year, for example, are under $25,000 for the first four years following graduation. "With living expenses, and loans from undergraduate schools, there is no way a medical student can afford to pay back large amounts of high-interest loans," Kraus says.

The Medical School does have other ways for students to finance their education, however. The Alumni Association's Medical Scholars Program, and the Medical Science Training Program, for example, provide support for qualified students to do research. The academic program gives students the flexibility – and many choose this route – to stay in school an extra year. Those working towards their M.D. degree are required to pay full tuition, currently $3,197 per quarter, for 13 quarters. After that, they are currently charged only $270 per quarter. Stanford is also unique in that it encourages students to work while taking pre-clinical courses, especially in a position related to the students' interest in science or medicine. As a research assistant or teaching assistant, students not only earn a living stipend, but have remitted tuition benefits as well. About 150 medical



John Steward



Stuart Rosse, Kathy Kraus

students took advantage of this opportunity during the 1981-82 school year, for example, in addition to a variety of other jobs.

But even with these possibilities, some students feel there is a price to pay. "If you take extra time for school," Laufer explains, "it cuts down your earning potential and ability to pay back your loans."

And not all students think the opportunity to work is such a great idea. "Stanford is one of the few schools that encourage students to work while in school," says Cliff Greyson, a third-year student. "It's fine if you're lucky enough to find a position in which you're interested. But the necessity to work, even if you don't like what you're doing, creates neurotic, unhappy people—especially when you're supposed to sleep, eat, and breathe medicine," he adds, quoting a professor's welcoming remarks.

Gary Schwartz worked for a few years before starting medical school to earn some money. Now in his second year, he works as a research assistant in the Department of Medicine. He plans to spread out his pre-clinical course work for three years, so he can get tuition benefits through his work. He'll have to quit his assistantship when he begins his clinical work, but at that point he'll only have one more quarter for which he'll have to pay full tuition. Schwartz has another problem, however. The financial aid administrators determined his mother should contribute $1,600 per year for his education. "My mother is widowed and makes only $16,000 a year," he says. "I don't think it's fair to expect her to contribute at all." So, Schwartz has been contributing her portion from his savings, in addition to his own contribution. "My savings are quickly being depleted, so I've resigned myself to having to take out loans." Even so, Schwartz says, he'll be in his 30's by the time he finishes his training. "It's hard to live like a student and restrict your lifestyle until you're 35 or so," "But," he adds, "Stanford is doing a good job in giving me what they think I'm entitled to."

Not everyone is as appeased as Schwartz, however, Greyson has GSL, ALAS, and Stanford loans. He's worked as a research and teaching assistant, and has always held summer jobs. His parents' contribution was set at $10,000 per year, but not wanting to take their money, he's provided their contribution. Recently however, his parents' financial status took a "nosedive," and Greyson finds himself available for much more assistance.

"It's ironic that even though *my* financial situation hasn't changed one bit, suddenly I'm eligible for so much more aid," he says.

Greyson says he doesn't need as much money as he's allocated on which to live. Others, such as those living in married student housing, are being subsidized on both ends. Meanwhile, those who need more money may have to resort to high-interest loan sources, he explains.

"Stanford has a limited amount of money to give," he notes. "It should be allocated through assistance programs tailored to individual needs."

In response to Greyson's criticism, Kraus says the School is bound to certain regulations in determining financial aid, but tries to tailor it as much as possible. "We are responsive to students' changing needs," she says. "We encourage students to live on less that the budget, hoping that perhaps they won't have to take out a high-interest loan. But most feel the budget is pretty frugal."

Greyson shares in the feeling that the future classes will be more homogeneous. "Those from low-income families can't afford to come to medical school," he says. Laufer agrees. "Why should they bother? They struggle to get to medical school, struggle while they are in medical school, and struggle once they get out. It's just not worth it. They can make more money more easily in another profession."

The challenge for the Medical School, then, is keeping the best students from opting for other professions. Students, such as Laufer, are becoming politically involved to enlighten the federal government to medical students' plight. Administrators are continually seeking out new sources of financial support. Meanwhile, they are trying to educate students in debt management, hoping to make them a little more at ease with the prospects. But for many, the bottom line is how much an individual wants to be a physician. "Students will have to make sacrifices, just at I and my classmates are," Laufer says. "But the end justfies the means. And with help from the federal government, we'll make it to the end."

Shirley Kraus is a writer for the Stanford University Medical Center News Bureau and associate editor of Stanford M.D.

THE EDUCATIONAL NEEDS OF STANFORD MEDICAL SCHOOL GRADUATES

Non-academic components are just as important as clinical and basic science skills to ensure professional competence and success.

by Dan Lessler

The mission of Stanford Medical School, according to the Faculty Senate, is to train leaders in all fields of medicine. Leadership requires excellence that goes far beyond the mere acquisition of knowledge. True leaders in medicine not only bring together disparate scientific ideas into new and creative insights, they possess an awareness of the world that motivates them to question their role in medicine and the impact of medicine on society. Also, effective leadership requires an equanimity that allows a person to live with the pressures and responsibilities of leadership, without being engulfed by them.

I began medical school just about a year ago. I've since wondered if Stanford is the right medical school for me. What are the educational needs of leaders in all, yet undecided, fields of medicine? When I hear of the Faculty Senate arguing in favor of reinstituting grades, or admitting students without interviews, I wonder if the school's perception of those needs is in fact, similar to my own.

As an institution, Stanford possesses four aspects that are central to training leaders in medicine: academic excellence, reflected in an outstanding faculty committed to research; a flexible curriculum; a diverse student body; and a growing institutional commitment to the non-academic needs of medical students.

Students and faculty seem to be in general agreement as to the presence of these aspects. The discord, however, concerns the relevance of each of these aspects in relation to the mission of the School. The faculty's scrutiny of the latter three characteristics in particular, suggests the need for discussion.

One of Stanford's greatest resources is the student body. A bold and diverse group, the students' varied academic backgrounds and life experiences give the school an unmistakable vitality.

They force the school to confront emerging issues in medicine. For example, more than one-third of my class are women. What can they contribute to a male-dominated profession? The School has the opportunity, and the obligation, to explore such issues.

The diversity of the student body also contributes to its fiercely independent and iconoclastic nature. These are the characteristics that make Stanford's graduates able to contribute to research in the basic and clinical sciences.

The personal diversity students have provides them with the willpower to remain intellectually and spiritually alive, and so better able to serve as physicians. In medicine, as in every field, the very best people make time for other interests, such as books and the arts.

The students' diversity is acknowledged, in a sense, by Stanford's flexible curriculum. A large number of students have the opportunity to become involved wth some form of scientific investigation. Having participated in research for the first time this summer, I now understand and appreciate its value, not only as a mechanism to further medical knowledge, but as a means to sharpen my own intellect. Through familiarity with inductive inference, students can better develop a productive line of questioning in attacking a problem and be more skeptical of what they read in medical literature.

Involvement with research may be the most obvious way students benefit from the flexible curriculum, but it is not the only way. Students who choose to complete their medical training in five years can take time to pursue studies outside the basic sciences. Exposure to economics, ethics, or behavioral science, for example, is crucial for people who will eventually be intimately involved with the integration of medicine and society. Innovations in health care financing and delivery, and the increasing number of ethical issues physicians confront in their practice, promise to affect the future of medicine as much as will the rapid development of molecular medicine.

As Victor Fuchs has so aptly pointed out, "Under the competitive cost-conscious conditions that are likely to prevail in the 1980s, researchers will be expected to answer the questions 'How much better is the innovation?', and 'How do the expected benefits compare with those that could be obtained if the resources were used in some alternate way?'" The answer to these questions require the understanding of how medicine and medical research impact on society, as well as the knowledge of basic and clinical science.

In the past, the Department of Family, Community and Preventive Medicine (FCPM) has facilitated this aspect of education by offering courses in biostatistics, health care policy, and medical ethics. These courses have received mixed reviews, but recommendations that FCPM be scaled down or abolished seem like the wrong solution to a real problem. The thought of neglecting such burgeoning areas of medicine is antithetical to an institution that professes to be scholarly. A few years ago, when the School felt the Department of Medical Microbiology lacked the resources to be considered one of the best in the country, it made the commitment to see that the Department achieved its full potential. The same commitment needs to be made to the development of research and medical education in areas of medicine distinct from the basic sciences.

Another commitment should be made to ensure a continual nurturing and development of individuals with more than simply a well-trained intellect. Stanford's selection of diverse and independent students is in line with this goal. The process of learning how to live and serve as physicians without being consumed by the day-to-day pressures of medicine is an important part of any medical education, but essential in a program that aims to produce leaders.

Unfortunately, medical training historically has not recognized this process as particularly important. As medical students and physicians, we have paid the price. A recent *New England Journal of Medicine* article reported the suicide rate among physicians in this country is more than twice the rate of the general population. Many medical schools, including Stanford, make psychiatric counseling available to their students. But the decision to seek counseling is an individual one. Not everyone who might benefit chooses to seek help.

The recent creation of the Committee on Well-Being of Medical Students illustrates Stanford's recognition that it is in part responsible for students' welfare. For example, during the past three years the Committee has designed and implemented a course dealing with many of the personal and psychological issues involved in medical training, recommended and helped create the position of Medical Center Ombudsman, and established a student resource center appropriately entitled Broca's Area. Institutional attention to these aspects of medical education is essential to the ongoing process of students learning to deal with the sacrifices they will undoubtedly be called upon to make, and recognizing their limits. By doing so, many may be more able to keep abreast of the medical advances that accumulate almost geometrically.

Also, in the short time he has been at Stanford, Dean Dominick P. Purpura seems to have made a genuine effort to get to know students, and listened carefully to their concerns. Under his recommendation and guidance, the establishment of two new deanships, Minority Affairs and Medical Education, and the creation of a Committee on Bioethics, indicate that he possesses the broad perspective on medicine necessary to ensure that Stanford continues to be progressive in its approach to medical education.

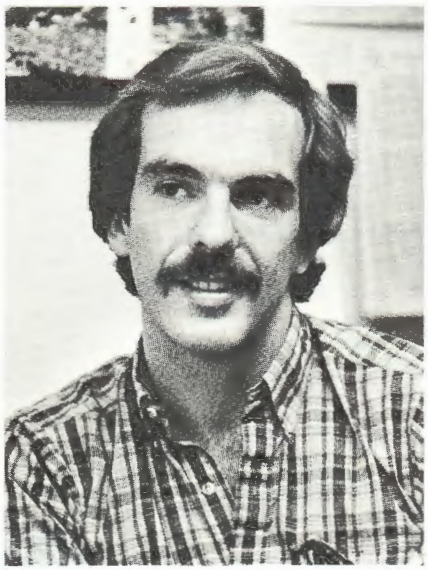
Stanford provides the many components other than basic science necessary in training leaders in medicine. It is up to the students to balance the unquestionable necessity of mastering the basic sciences, along with research, other coursework, and attention to personal well-being. In light of the diversity of the student body, it is appropriate that students should have the responsibility of tailoring their medical education, as long as it is consistent with the mission of the medical school. But the decisions and choices students make are difficult ones.

Some faculty seem to believe students have abused the freedom they are given to make decisions about their education. Consider, for example, the recent Faculty Senate discussion about grades. Stanford currently has a strict pass-fail grading system. While a proposal to reinstate grades was voted down by the Senate, several faculty argued that grades were necessary to reward excellence and ensure an acceptable level of achievement among all students. The implication was that students were not working hard enough. But the absence of grades allows students to respond intelligently to the competing demands of their educational needs. Most students recognize the unquestionable importance of mastering the basic sciences, but sometimes devote less time to particular tasks of memorization so they may do research or look after their own well-being. In general, their decisions reflect good judgment, since many students are taking advantage of opportunities at Stanford to pursue scholarly interests in the Medical Center or other parts of the Campus, and the attrition for academic reasons is minimal.

Faculty and students should discuss ways of helping students design programs that take their needs into account and reflect the School's mission. Such discussions, perhaps part of a well-structured advising system with faculty members committed to working with students to achieve a mutual goal, would be far more helpful to students than restricting their academic freedom. It would also serve to reduce the existing devisiveness among many faculty and students.

Stanford offers what I consider to be and excellent opportunity to prepare for a career in medicine. I expect that molecular medicine *will* change the face of medical practice in the future, and here students have a chance to study and become involved with the forefront of medical research. But physicians' contributions to society also require a familiarity with broader issues in medicine, as well as an ability to take care of themselves. I hope Stanford will pursue excellence in these areas of medical education with the same commitment that it has pursued excellence in the basic sciences.

Dan Lessler is a second-year medical student as Stanford.



TELFORD WORK: MEDICAL SLEUTH

Led by his passion for wildlife and adventure, this eminent tropical disease expert's professional odyssey has taken him all over the world.

by Hali Wickner

Work conducted autopsies on many monkeys, such as this one, in the Kyasanur Forest, Mysore, India for virological investigation and pathological clues as to treatment of humans (1957). (top)

In Shigga Village, Mysore, India, Work diagnosed this villager as having an acute case of hemorrhagic fever, which contributed to clinical description of a new disease (1957).

When Telford Work graduated from Stanford University School of Medicine in 1945, most of his classmates chose specialties in the new frontier of biomedical science, and considered him "square" for choosing infectious diseases and tropical medicine. But Work, with a life-long insatiable passion for wildlife and adventure, disregarded his classmates' scrutiny, and persevered. Patience, diplomacy, dedication, and adaptability saw him through a 35-year career of medical sleuthing in every continent except Antarctica–studying diseases of populations and acquiring experiences few people can top.

Work's odyssey has not gone unnoticed. One of the world's foremost authorities on viral diseases transmitted by insects, he was recently honored by the American Committee on Arthropod-Borne Viruses, which presented him with the 1981 Richard M. Taylor Medal for distinguished contributions to his field. He's published more than 75 scientific articles, served on numerous scientifically elite committees and panels, editorial boards of journals, World Health Organization and Pan American Health Organization study groups, and

Work tried to educate villagers in Bengga, Fiji Islands about parasitology, epidemiology, and control of mosquito-borne filariasis with a documentary film (1950).

belongs to 11 scientific societies.

Acquiescing to "scientific aging", Work has long since given up life in the wilds for the possibly more sedate role of a college professor. He teaches infectious and tropical diseases in the School of Public Health, and microbiology and immunology in the School of Medicine at University of California, Los Angeles. Stepping into his office however, is stepping back in time with Work. A vast array of atlasses, wildlife anthologies, and piles of photographs attest to his world-wide travels, serving as memorablia of a "truly satisfying career."

California, 1921...

Work became interested in natural history and ecosystems during his childhood in the San Joaquin Valley. With the La Brea tarpits nearly solid, and Los Angeles not quite the metropolis it is today, Work could see the natural conditions and beauty of peripheral Los Angeles. He pursued his interests as an undergraduate in biological sciences at Stanford University, often organizing ornithological expeditions. He was one of the first to recognize and record the threat civilization posed for the California condor.

With the country gearing up for war, Work began medical school in 1942. He matriculated 12 months a year, thus receiving his medical degree by 1945. Lured by the prospect of a war in exotic places, he had signed up for active duty with the US Navy a few years earlier. His first assignment to Treasure Island in San Francisco was a geographical letdown, but sound clinical preparation for his future as an independent medical officer.

"On one island, we had to visit every village and watch the native firewalkers perform the symbolic story of the Fijian oven by walking on glowing coals. Then they were ready to work."
—Telford Work

During his Treasure Island stint, however, he heard a talk by his former mentor, Leo Eloesser, that unwittingly pointed him towards his future. Eloesser, director of United Nations relief efforts in China, made a plea for preventive medicine instead of sophisticated technology to aid countries like China. "That address had a profound effect on me," Work recalls.

U.S.S. Monongahela, 1946...

Work went on board as a medical officer at the end of World War II. The oil tanker, cruising to the Persian Gulf to get fuel for occupied Japan, stopped at tropical ports along the way. Thus, Work got his first glimpse of the disease problems of Asia and Africa. His biological background, together with the hot climates and exotic diseases prompted Work to aim for a career in tropical medicine, which would allow him to deal with diseases of populations. After he was released from the Navy in 1948, he enrolled in the London's School of Hygiene and Tropical Medicine, from which he received a diploma in tropical Medicine and Hygiene.

Thus, Work joined the ranks of Stanford alumni, including James Sapero, '32, one of the Navy's first authorities in tropical medicine; and Ray Watten, '49, director of the Gorgas Memorial Institute for Tropical Medicine in Panama.

Fiji Islands, 1949...

Having received his degree, Work traveled to the South Pacific via propeller plane to study filariasis, a parasitic infection of the tropics spread by mosquitoes. First, however, came weeks of cultural protocol. "Wherever we went, we learned to meet people on their own terms and to accommodate the situation," he says.

For example: "On one island," Work recalls, "we had to visit every village and watch the native firewalkers perform the symbolic story of the Fijian oven by walking on glowing coals. Then

Work collected uninfected Aedes polynesiensis by bite for experimental infection on Mosquito Island, Suva Harbor, Fiji Islands (1950).

they were ready to talk filariasis."

Work still has a whalestooth given to him by the Fijians when they indoctrinated him as chief. "You had to become a member of their population before you could get to work," he says.

United States, 1951...

After about a year and a half in Fiji, Work realized he didn't have enough knowledge about the population as a patient. So, he returned again to school, this time at Johns Hopkins University School of Hygiene and Public Health under a Rockefeller Foundation scholarship, for a master's degree in public health.

Educated, but not yet gainfully employed, Work joined the Rockefeller Foundation's new arbovirus program with Nobel Laureate Max Theiler, who developed the 17D yellow fever vaccine.

Arboviruses, a short term for arthropod-borne viruses, are tramsmitted to humans by blood-sucking arthropods, primarily certain species of mosquitoes and ticks. They are so varied and widespread, Work says, that they cause acute central nervous system disease, hemorrhagic fever, and other diseases in all inhabited regions of the world. These viruses have a "silent cycle" in the blood circulation of wild animals, often birds and monkeys. When the insect feeds on the host animal, it becomes infected with the virus which it then transmits to people it bites.

Egypt, 1952...

After five months in New York, the Rockefeller Foundation sent Work to Cairo. There he helped establish the role of wild birds in the ecology of West Nile virus and the fever it causes. His concepts have withheld the test of time, and have been used to investigate St. Louis encephalitis, Murray Valley encephalitis, and other human illnesses caused by arboviruses with avian hosts.

Work and his colleagues isolated Sindbis virus while in Egypt. Perhaps more than any other, hundreds of molecular and other virologists have used this virus as a tool in their quest for a basic understanding of the mechanism of alphavirus replication and pathogenesis.

Commenting on the Sindbis virus discovery, Dr. Charles H. Calisher of the American Society of Tropical Medicine provides a bit of insight about Work:

"The isolation of Sindbis virus might be considered a throw-away, merely icing on the cake. However, I can assure you Work considers nothing as extraneous. He files away bits and pieces of information: virus strains, sera from aardvarks, lists of NIH *ad hoc* committee members from 1960, annual reports of the Burundi Ministry of Health – anything. He tosses out nothing, either physically or mentally, as anyone who has seen his library will attest. The Collier brothers had nothing on Work. He is a thorough, nay meticulous, cataloguer of what to some may seem trivial, but years later he can dredge up a germaine pair of sera, a fact, a name, or a scientific article. He puts two and two together and usually gets four. It may be years between the observations, but many never get the connection at all."

India, 1954...

Work was transferred to Poonah to become director of the Rockefeller Foundation and Indian Council of Medical Research Virus Research Center. He contributed to the finding of the Japanese encephalitis in South India, and the elucidation of the Japanese encephalitis-West Nile interface. In 1957, he came upon what he considers one of the most significant and rewarding accomplishments. Work discovered the Kyasanur Forest disease, a tick-borne viral hemorrhagic fever that killed a quarter of its adult victims in Southern India.

Work's laboratory had received reports of monkeys dying in the Mysore forests, 500 miles to the south of Poonah. Work thought it might be yellow fever, since monkey deaths were associated with the disease in the western hemisphere. But one fact bothered him. Yellow fever had never been known in Asia.

Work and his deputy director set out at once to visit the villages near the infected areas. Natives told them about a mysterious fever-like illness that often attacked indigenes who has seen or smelled dead monkeys in the neighboring forests.

Identifying the new disease took 11 days, and about 2,000 miles of backroad travel–an easy task compared to determining tramsmission of the disease. Most natives worshipped Hanuman, the monkey god. According to Hindu scriptures, monkeys are sacred. Because of this, health authorities were afraid to help Work's team locate sick monkeys, and reluctant to let them collect healthy ones. It took a month to obtain official permission to shoot and examine some healthy monkeys for clues. They found ticks on them, which provided evidence of the first tick-borne virus disease of the tropics, Work says.

"After we examined the first cases, we knew we were not dealing with yellow fever," Work explains. "This was where my basic education–a la Arthur Bloomfield–and experience as a physician came to the forefront. Out in the boondocks, the physical examination–a la George Barnett–was invaluable. Our efforts led to the most rapid elucidation in history of a viral disease and the first successful demonstration of a viral hemorrhagic fever for American Medicine. It was a culmination of clinical medicine and biological science."

As with all his ventures, Work recorded the experience with his ever-present camera. The photos became part of his Annual Lecture on Kyasanur Forest Disease to Harvard Medical School students.

"I never realized how tired I was during my five years in India," Work reminisces. "I realized now only a young person could have done it."

Soviet Union, 1959...

Leading Russian virologists invited Work to their country as a result of his work in Kyasanur Forest Disease, which was antigenically related to Omsk hemorrhagic fever and Russian spring-summer encephalitis–two local diseases of a tick-borne virus. Work piled his wife and three children in an old Chevrolet, and took off on a four-month journey that took him 11,000 miles through Eastern Europe. They were among the first American civilians to penetrate Russia towards the end of the cold war. Work's youngest daughter was the ticket to the Russians, who loved children, Work recalls. His experiences there were substance for yet another photo documentary, "Fever, Ticks, and Caviar."

United States, 1960...

Work promised himself he'd never work for the government again, but sure enough, he accepted a congressional appointment to head the Virology Section of the Center For Disease control (CDC) in Atlanta. He spent the next seven years establishing a world-class laboratory for the study of arboviral diseases at CDC and upgrading public health laboratories throughout the country. When he began, Work says, only 12 states had adequate facilities. By the time he left in 1967, 44 states were able to diagnose and analyze arthropodborne viruses.

During his time at CDC, Work led efforts to isolate the Venezuelan Encephalitis virus from mosquitoes in Everglades National Park. He had seen it in South Florida and had found antibodies of it in the Seminole Indians. The discovery of the virus, now known as the Everglades virus, led to isolations of Mahogany Hammock, Pahayokee, Shark River, and Gumbo Limbo viruses. Work showed for the first time that South Florida had a virological spectrum related to the virological fauna of more southernly subtropical and tropical areas. From a viral evolutionary standpoint, the connection was historic.

"Work considers his discovery of the Kyasanur Forest Disease one of his most significant and rewarding accomplishments."

Work was responsible for CDC investigations of dengue in Puerto Rico, and St. Louis encephalitis. In Tampa Bay, Houston, and other urban centers, he established capture programs for collecting migrating and resident birds in central America and the US side of the Gulf of Mexico. The bird studies led to isolation of South American strains of eastern equine encephalitis virus and Mayaro virus in Louisiana, which settled the conjecture and showed that migrating birds do carry viruses between the American continents.

During this time, California encephalitis was recognized as a disease of importance in the north central state bordering on or contiguous to the Ohio-Mississippi drainage. Work prompted the CDC to embark upon a national support program for the study of this children's disease, as well as for a number of other important diseases.

WHO appointed the CDC's Arbovirus Unit as a Regional Conference Centre for Arboviruses in the Americas in 1961. It is stationed in Fort Collins, Colorado, and houses the Arbovirus Catalogue, and serves as an international and national resource.

Work left the CDC in 1967 to return to Southern California and to join the faculty at UCLA. Since then, he has elucidated the mosquito-borne St. Louis, Western equine, and California encephalitis viruses. These isolations provided a threshold for extension of neurovirus epidemiology of Arid Zones into Baja California. This was an area where Work began ecological exploration as a member of the Stanford Natural History Expedition in 1946.

His wife and co-worker, Dr. Martine Jozan, has accompanied Work on other investigations, including the Japanese B-West Nile complex in Eastern Indonesia in 1970, the Venezuelan equine encephalitis up the west coast of Mexico in 1972, and the Senegal Basin of West Africa in 1976. In 1978 he went on sabbatical to Papua New Guinea and Western Australia. There, he exposed among the Aborigines of the tropical North a pulsating focus of Murray Valley Encephalitis as the probable source of epidemics which occur intermittently in the heavily populated Southeast portion of the continent.

Closer to home on Santa Cruz Island, Work isolated tick viruses from seabirds in an attempt to further understand the evolution of viruses and their long-distance dissemination.

By returning to Los Angeles, Work has completed his professional voyage that has enriched his own life as well as advancing the field of diseases of populations. And while Work feels he is stepping back, viral pathology and epidemiology are moving forward.

"Order of authorship begins in the middle, moves to the first position, then drifts backwards to last place as the sphere of collaboration expands and young disciples take their place," he says. "I think we are going to discover that more diseases, including chronic ones, are due to episodes of viral infections. And rapid viral replication produces mutants that will continue to cause new diseases. When I was in medical school, the virus was a fuzzy concept. Now there are more than 400 different viruses, and probably many more to be found."

Hali Wickner is a former writer for the Stanford University Medical Center News Bureau. She is now on leave of absence from UCLA in Switzerland.

ALUMNI NOTES

ASSOCIATES

Robert J. Gerety, pediatrics resident at the Stanford University Hospital from 1974-75, has received the United States Public Health Service (USPHS) Outstanding Service Medal in recognition of his work in the development and regulation of the newly liensed hepatitis B vaccine. Gerety also has received a USPHS Commendation Medal for his role in developing an animal model for the study of forms of viral hepatitis unrelated to hepatitis B. He is director of the viral hepatitis research and regulatory program of the Bureau of Biologics in Bethesda, Maryland.

Lester B. Salans, medicine intern and resident at the Hospital from 1961-63, and metabolic research fellow in 1963-64, has been named director of the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases. Prior to this position, he was chief of the institute's diabetes, endocrinology and metabolic diseases research program, the largest of the institute's four major research fields.

Please write!

Let us know of your achievements! *Stanford MD* wants to know of your professional, or other, activities. And if you know what other alumni are doing, tell about them too! Send all information, including photographs, to Editor, *Stanford MD* c/o News Bureau, Stanford University Medical Center, TC 135, Stanford, California 94305.

CLASS NOTES

Luis Dominquez, '81 has joined the Deming (N.M.) Medical Clinic staff. He completed his internship in internal medicine at Stanford as well. He plans to specialize in family medicine at the Clinic, treating "everything that comes to the door short of major surgery."

Sally Faith Dorfman, '76 has just finished two years of epidemiology training at the Center for Disease Control, Atlanta, and has moved to New York to join the obstetrics and gynecology faculty at Mt. Sinai Medical Center. She's started a private practice as well, and works part-time as a special consultant to the New York City Department of Health, Bureau of Maternity Services and Family Planning.

James Tang, '75 has just completed his plastic surgery residency at University of Texas Medical Branch in Galveston, and has accepted a position as assistant professor of plastic surgery there. During his residency, he participated in a "historical event"—reattaching for the first time in the United States one extremity, in this case a left foot, to another extremity, in this case a right leg.

Robert Goodwin, '72 has been in private practice of child and adult psychiatry in San Francisco since finishing a fellowship in child psychiatry at Mt. Zion Hospital and Medical Center.

Paul J. Rutala, '72 is an assistant professor of internal medicine at the University of Arizona College of Medicine. He is also an attending physician at the Arizona Health Sciences Center, past-chief of the Medical Clinics, alternate triage officer, and director of quality assurance. He also consults at the Tucson V.A. Hospital, attends at the Handmaker Jewish Geriatric Center, and volunteers at the Free Clinic at Tucson. Rutala recently received a fellowship in the American College of Physicians. He is conducting research in medical education and in the development of techniques to evaluate clinical competence. He has published numerous articles about his work.

Roland Ciaranello, '70 is one of the first two recipients of a "John Merck Research Fellowship"—a three-year, $150,000 award. Ciaranello, an associate professor of psychiatry at Stanford, plans to use the award for research of autism (see related science news story).

Roland Ciaranello

Anne G. Osborne, '70 has been selected for Fellowship in the American College of Radiology in honor of her "special contributions to the medical profession." She is affiliated with the University of Utah School of Medicine, Veterans Administration Medical Center, and Primary Children's Medical Center, Salt Lake City.

Philip Matin, '67 is an associate clinical professor in nuclear medicine at University of California, Davis, and chairman of the nuclear medicine department at Roseville Community Hospital. He has published a number of articles on nuclear medicine, and has recently published the second edition of his book, *Clinical Nuclear Medicine.* His other area of research is sports medicine.

Henry F. Davis, '62 has been in family practice in Carson City, Nevada. He has 11 children, and one grandchild. His wife, Joan, is a legal secretary, "learning to support me in my later years in a manner to which I hope to become accustomed."

Harry R. Glatstein, '61 has assumed the duties of president of the Santa Clara County Medical Society. Glatstein has an internal medicine practice in Los Gatos. He has served on the Medical Quality Review Committee of the Board of Medical Quality Assurance, is clinical associate professor of medicine at Stanford, and was chief of

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the medical staff at Community Hospital of Los Gatos-Saratoga, in addition to a number of other positions.

Augustus A. White III, '61 has been honored by CIBA-GEIGY Corporation as part of its ongoing Exceptional Black Scientists Poster Series. White is currently orthopedic surgeon-in-chief at Beth Israel Hospital (Boston) and the Harvard-MIT Division of Health Sciences and Technology. His major interests are in spine and fracture healing, and his work with patients and extensive study have established guidelines in the way spinal injuries are treated. He has also received the U.S. Jaycees' Ten Outstanding Men Award, and the Martin Luther King, Jr. Medical Achievements Award.

Denny S. Anspach, '60 has been selected for Fellowship in the American College of Radiology in honor of his "special contributions to the medical profession." Anspach is affiliated with Central Vermont Hospital, Berhn, and Gifford Memorial Hospital, Randolph.

Richard P. Jobe, '49 has been elected president of the California Society of Plastic Surgeons. Jobe is affiliated with many hospitals on the Peninsula, and is a clinical professor of surgery at Stanford. He is vice-president of Interplast, Inc., chairman of the cartilage section of the Northern California Transplant Bank, and parliamentarian for the educational foundation of the American Society of Plastic and Reconstructive Surgeons, in addition to a number of other professional affiliations. He has authored 27 technical papers on plastic surgery.

Francis Curry, '46 is operating a free medical clinic next to St. Anthony's Dining Room in San Francisco's Tenderloin District. He started the clinic four years ago with $50,000 he raised himself. He also is a consultant in tuberculosis at San Francisco General Hospital, and a clinical professor of ambulatory and community medicine at University of California, San Francisco.

Jean Spencer Felton, '35 has an annual award named in her honor by the Western Occupational Medical Association. The award is given to the author of a book, journal article, or other written work important to the field of occupational health.

Ralph Chas Lewis, '32 has been serving part-time as physician in charge of the Hyland Donor Center, San Jose, since his retirement in 1976. He and wife Roberta attend continuing education sessions at Stanford. The Basic Science for Clinicians course is "thrilling and mind-blowing – somewhat advanced over our course of biochemistry in 1927 down on the Farm," he says.

Edwin M. Soderstrom, '31 has retired from practice, but consults one day a week. He is writing a book about what he perceives medicine to be today. "Somewhere along the way we have lost the art of training 'doctors,' and now have an assembly line of automated medicine," he says.

Albert R. Behnke, Jr., '30 has recently received the Boerema Award in Hyperbaric Medicine at The Long Beach Memorial Hospital. He also received an honorary degree from Whittier College. His work involves studying body composition, specifically radiologic estimates of body fat, the physiology of deep sea diving, and hyperbaric medicine.

Joseph H. Boyes, '30 is a clinical professor of surgery at the University of Southern California, and emeritus editor at *The Journal of Hand Surgery.* He is also an adjunct distinguished member of the Division of Academic Affairs, Orthopedics, Scripps Clinic and Research Foundation.

Albert Paul Krueger, '29 and his colleagues have just had another book published, entitled *Biologic Effects of Environmental Electromagnetism.* Since 1957, he has been working at the Air Ion Research Laboratory, which he established at University of California, Berkeley.

Leona M. Bayer, '28 received the 1981 Society of Adolescent Medicine's Charles A. Field Award for Outstanding Research in Adolescent Medicine. She is also currently on the medical staff at Min An Health Center, and honorary staff, Department of Medicine, at Pacific Medical Center, San Francisco; advisory board of the U.S.-China Educational Institute; and serves as consultant to the California Medical Association, Patient Nutrition Education Program of the Dairy Council of California, and Institute of Human Development at University of California at Berkeley.

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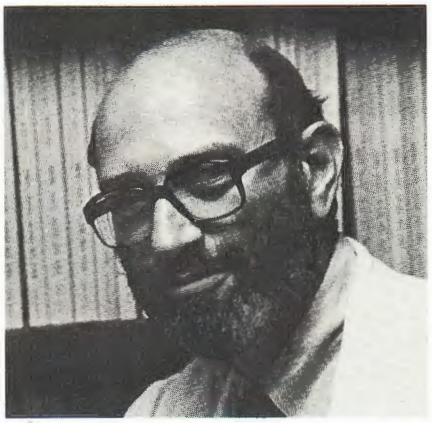


Stanley N. Cohen

Dr. Stanley N. Cohen, chairman of the Department of Genetics, has been inducted into the "California Inventors Hall of Fame" for his work in genetic engineering. Considered a key pioneer in the field, Cohen and his colleague, Dr. Herbert W. Boyer, University of California, San Francisco, in 1980 patented a technique that permits genetic material from the cells of animals to be dissected, recombined in new ways, and then spliced into the genetic material of bacteria.

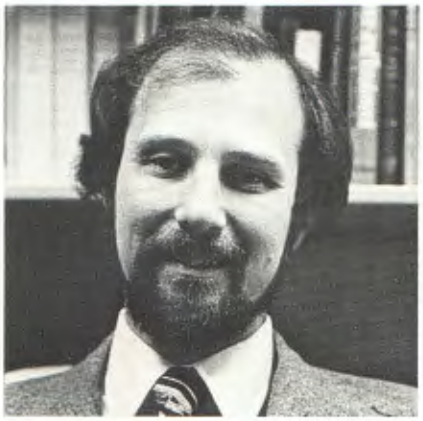
Dr. Howard Jones retired from his position in the Department of Radiology after more than 30 years at Stanford. He was head of private radiology in the Hospital until 1972, and was involved in the original planning of the radiology department when the Medical School moved to the Stanford campus in 1959. Said his successor Dr. Robert Brown, "His longtime commitment to emphasizing good service to both the patient and the attending physician has been responsible for the continued success of Community Radiology as an entity."

Dr. Donald Dyson was honored as most outstanding regular faculty member at the 1981-82 Department of Gynecology/ Obstetrics annual residents' dinner. **Dr. Gerald Shefren** was honored as most outstanding member of the clinical faculty, and third-year resident **Dr. Barbara Peters** was recognized as the outstanding resident teacher for the second consecutive year.

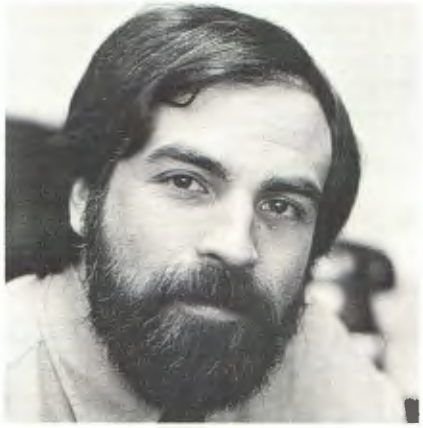
Dr. David A. Hamburg, chairman of Stanford's Department of Psychiatry and Reed-Hodgson Professor of Human Biology from 1961 to 1975, has

HONORS

David A. Hamburg



David Spiegel



Jay Brodsky

been appointed president of Carnegie Corporation of New York. He has been a Carnegie Corporation trustee since 1979, and heads an interdisciplinary division of health policy research and education at Harvard University. Formerly, he was president of the Institute of Medicine at the National Academy of Science in Washington D.C.

Dr. Peter S. Moskowitz, assistant professor of pediatrics, has been elected president of the Pacific Coast Pediatric/ Radiology Association for 1982-83.

Dr. Paul Ponganis received the Robert D. Dripps Memorial Award as the outstanding anesthesia housestaff member at the Department of Anesthesia's 1981-82 annual dinner. **Dr Dean Smith** received the same award in acknowledgement of his "exceptional clinical skills and outstanding leadership skills through service as chief resident in anesthesia." **Dr. Robert Sladen,** assistant professor of anesthesia, received the Faculty Teaching Award from the housestaff for his "exceptional effort and dedication in upgrading the didactic teaching program of the housestaff." **Dr. Donald Stanski,** assistant professor of anesthesia and medicine, received the Ellis N. Cohen, M.D. Achievement Award for his accomplishments and contributions to the field best exemplifying the standards characterizing Cohen's career at Stanford.

Drs. Jay B. Brodsky, clinical anesthesia; **Paul T. Pitlick,** clinical pediatrics; and **David Spiegel,** clinical psychiatry and behavioral sciences, have been appointed associate professors in the Medical School. Brodsky is chief of the Thoracic Anesthesia Service; Pitlick has done extensive research with the cardiology aspects of pediatric cardiovascular surgery; and Spiegel is director of the Stanford Adult Psychiatric Outpatient Clinic.

Dr. Eugene M. Farber, chairman of the Department of Dermatology, has been named Jane and Hugh S. Center Professor of Dermatology. A trust fund set up by the late Hugh S. Center, a prominent San Jose attorney, is providing annual support for the professorship for five years, when Farber plans to retire. Farber is internationally known for his research and clinical expertise in skin deseases, particularly psoriasis.

Eugene M. Farber

Spyros Andreopoulos, editor of *Stanford MD,* has been appointed Director of Communications for the Medical Center. Andreopoulos now heads the Office of Communications, which organizes and conducts news information and public relations activities for the Medical Center, including the Medical School, the Hospital, and the Clinics. He has been with the Medical Center since 1963.

Dr. Jack D. Barchas, professor of psychiatry and head of the Nancy Pritzker Laboratory for Behavioral Neurochemistry, has been appointed associate chairman of the Department of Psychiatry. He was also recently appointed head of the Board on Mental Health of the National Academy of Sciences.

Dr. Eugene Bleck, professor of clinical surgery (orthopedic), has been appointed head of he Division of Orthopedic Surgery. He has been on Stanford's faculty since 1972, and has served as president of the American Academy for Cerebral Palsy and Developmental Medicine. He is currently president-elect of the Pediatrics Orthopedic Society.

Drs. William Dement, professor of psychiatry and behavioral science, **Avram Goldstein,** professor of pharmacology, and **Dominick Purpura,** dean of the Medical School are among 49 new members recently elected to the Institute of Medicine of the National Academy of Sciences.

Dr. John Farquhar, professor of medicine and director of the Stanford Heart Disease Prevention Program, has been awarded the James D. Bruce Memorial Award for distinguished contributions in preventive medicine. The award is given yearly by the American College of Physicians.

SUH, Children's Hospital to meld

The articles of incorporation for a consolidated pediatric medical facility have been approved by the boards of directors of Stanford University Hospital (SUH) and Children's Hospital at Stanford (CHS).

The action provides a formal corporate framework for the new $40 million pediatric hospital to be built in conjunction with Stanford's $71.4 million Hospital Modernization Project.

The pediatric facility, which will retain the name Children's Hospital at Stanford, will be physically attached to SUH and is expected to be completed in 1987.

The new CHS will have its own corporate identity with a board of directors comprised of five members of the current CHS board and five from SUH's board.

The medical center will consolidate the 60 beds at CHS and the 44 pediatric beds at SUH. New CHS will continue to provide inpatient services in the 15 specialties now offered by both hospitals and will house the Stanford-Children's Ambulatory Care Center, providing 27 separate clinic services.

CHS, a nonprofit institution, and the Stanford University School of Medicine have maintained close ties since the pediatric institution was established at the campus in the 1920s.

Currently the hospitals are one mile apart and separated by a major thoroughfare. The consolidation must still pass through the review process of state and local agencies. Articles of incorporation must also be ratified by the trustees of Stanford University.

SUH modernization gets city okay

The Palo Alto City Council recently unanimously approved a resolution supporting in principle Stanford University Hospital's Modernization Project (HMP).

The council also told Stanford that it reserved the right to rescind its endorsement in 90 days if a hospital-based committee had not made what council members deemed sufficient progress toward settling longstanding discussions about private physician access to hospital-based services.

The council's endorsement for the $124 million project was sought by SUH as it files for a certificate of need (CON) from public agencies. The council endorsement is not required. However, the state and regional agencies which issue the CON review local community support while assessing whether the requested improvements are needed in the local area.

The resolution specifically noted that the support "does not constitute advance approval by the City of Palo Alto of any of the financial, enviromental, or physical aspects of the modernization project. The action of the City on those aspects within its regulatory authority must await full public hearings and review in accordance with the City's adopted procedures."

Since its presentation to the council, the resolution has served as the focal point of a debate about access by community physicians to hospital-based services.

For many months, SUH and local physicians have been negotiating the rules for community physicians' use of certain hospital-operated medical services, such as clinical labs, cardiac catheterization, radiology, and the hemodialysis center.

In asking support, Stanford President Donald Kennedy said, "there is nothing that this council can do that will be more influential in improving the conditions of medical care for the community, or that will more dramatically improve the conditions of medical practice, including access to facilities, than to lend its wholehearted support to the HMP."

The HMP will provide about 325,000 square feet of new space at the Main Center and will renovate about 165,000 square feet of existing space. It will provide some 190 new replacement beds, including new critical care bed units. Also planned is a new 22-room operating suite.

The plan is essentially not an expansion of the hospital, and will add only six beds to the current licensed total of 663.

Donald Tower

New Faculty Practice Program director

Donald B. Tower has been appointed executive director of the Faculty Practice Program at the Stanford University School of Medicine, announced Dr. Lawrence G. Crowley, vice-president for medical affairs.

"The FPP is an essential component of the Medical Center," Crowley said. "It is the base of the clinical practice of the faculty that serves patients throughout the state and the community as well as the teaching programs of the School of Medicine conducted through the Stanford University Clinics."

Tower will be responsible for administrative affairs, business operations, and policy and financial planning for the FPP in close liaison with the FPP's executive committee and the vice-president for medical affairs.

He will also be responsible for developing and maintaining all aspects of administrative and operational procedures of the FPP and the Clinics.

Tower, 39, left his position as administrator of the University Physicians, a practice group in Columbia, Missouri. He is known for the development of innovative computerized systems in the areas of patient registration, physician and hospital billing, and is experienced in the administration of large ambulatory care facilities.

Prior to his position in Missouri, he was executive director of Faculty Medical Practice, Memphis, Tennessee; and assistant director of business and finance, Arizona Medical Center, Tucson; and executive assistant director of admissions at the Los Angeles County Department of Hospitals.

Board sets hospital budget for 1982-83

The Board of Hospital Directors of Stanford University Hospital (SUH) recently approved a 1982-83 net operating budget of $161.9 million and a capital improvements budget of $7.2 million.

Also approved was a 13 percent average increase in the price of rooms.

The capital improvements budget included $1 million for a computerized admission, transfer, and discharge system, which is expected to significantly speed-up and streamline the processing of patient data. The capital budget also contained some $1.5 million for a computerized tomographic scanner and a linear accelerator to permit the hospital to incoporate the most advanced diagnostic and treatment techniques in the field of radiology, said Sheldon King, executive vice-president and director of SUH.

The board also approved a variety of price increases for various services, including an 11.6 percent increase for the operating room and 17 percent for use of the delivery room.

Thirty-seven different rates, depending on the type and acuity of care, currently are in effect at SUH. These range from $205 per day for healthy newborn babies, to a maximum of $1,825 for the highest level of intensive and coronary care.

Contributing significantly to higher rates, King said, are shrinking revenues from Medi-Cal and Medicare, whose funding accounts for about half of the 25,000 patients cared for annually at Stanford.

He said that the difference between costs to the hospital and the amount of reimbursement made by Medicare and Medi-Cal will represent a $14.6 million loss to the hospital unless the non-public health patients and insurance providers make up some of the difference as they have in the past two years.

King noted that pending legislation could alter radically the way in which state Medi-Cal and federal Medicare services are dispensed, leaving the hospital's financial projections for future years uncertain.

The increased prices, said King, were intended to compensate for inflation, including rising labor costs.

Less than one percent of the room increase would be used to help finance Stanford's Hospital Modernization Project, the improvement project expected to bring the hospital up to modern standards needed in coming decades, the director said.

King said that rising costs in a hospital environment are less controllable than in less critical environments.

"Obviously," he said, "we are doing all we can through careful management to reduce the impact of inflation and other costs. But this is extremely difficult in a high technology world where complex new technology and discoveries can't be ignored or delayed."

Clinics to undergo renovation, improvements

Stanford University Clinics will undergo extensive improvements under a $6.5 million construction and remodeling program approved recently by the Board of Trustees.

The project involves renovation of the first two floors of the Boswell Building, the facility adjacent to Stanford University Hospital where a majority of the 82 outpatient medical clinics will be located.

"This major effort will enable us to anticipate and prepare for technological developments in medicine expected in the coming decades," said David Mendelow, associate dean of the Medical School.

"We will be able to offer a more comfortable and efficient service to our patients, as well as providing an even more focused educational opportunity for our medical students, housestaff, and faculty," Mendelow said.

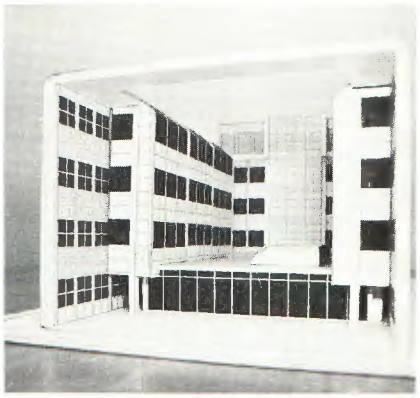
The project is expected to be completed in the fall of 1984. Improvements include completely redesigned and larger patient treatment rooms, achieved in part by construction which expands clinic space into a few feet of what is now the building's courtyard.

To accommodate teaching activities, four major conference rooms and 17 teaching rooms will be placed in the clinics area, said Langston G. Trigg, assistant director of facilities and project manager.

Procedures requiring local anesthesia but not requiring overnight hospitalization will be performed in four special procedure rooms.

Clinic renovation has already begun, Trigg said, at Hoover Pavillion, where the plastic and reconstructive surgery clinic and the pain clinic will be housed. Portions of these two clinics' activities are already at Hoover.

Funding is coming from a variety of sources, including at least $3 million from the Boswell Foundation, the original contributors to the existing facility. The Medical School, and Faculty Practice Plan reserves are expected to account for $2 million.



Boswell Building model

JCAH grants SUH three-year accreditation

Stanford University Hospital has become one of the first university teaching hospitals in the nation to receive three-year accreditation from the Joint Commission on the Accreditation of Hospitals.

In the accreditation letter, the commission said the Hospital "is to be commended for its efforts in providing high quality patient care."

"What is most significant," said Sheldon King, executive vice-president and director of SUH, "is that our survey showed the level of care at the Hospital to be consistently excellent. The survey results stem not only from the effort expended to prepare for the survey, but more importantly, from the continuous day-to-day work by employees and medical staff."

Patents for gene splicing products questioned

Stanford University officials were recently told why the U.S. Patent Office tentatively rejected claims in support of a genetic engineering patent sought by Stanford and the University of California.

Neils Reimers, director of Stanford's office of technology licensing, expressed confidence that the University's response will overcome the rejection. He said the University expects to file a response to the the issues raised in the "office action" before a three-month deadline.

The patent application covers the products of basic gene splicing and cloning methods invented by Stanley H. Cohen, professor of genetics at Stanford, and Herbert W. Boyer, professor of biochemistry at the University of California at San Francisco (UCSF).

An earlier patent covering basic techniques involved with the process had been issued in December, 1980.

Normally, the patent prosecution is confidential until the patent is issued. In this case Stanford chose to open up the process for public scrutiny to ensure that all potential objections might be raised.

Chief among the issues raised by the Patent Office is the question of whether or not the patent as filed was "enabling" –accurate and detailed enough to permit other researchers to use the genetic engineering techniques described.

The patent includes a description of how a particular plasmid (a circular form of DNA) formed during Cohen's and Boyer's original experiments. However, later experiments by Cohen showed that the interpretation detailed in the patent was incorrect.

Reimers said that the description was a tangential issue, since the basic genetic engineering process described in the patent has been proven to work in laboratories throughout the world.

A second issue is that a DNA process analogous to the one described in the patent can occur in nature under special circumstances. However, Reimers said scientists have pointed out that the naturally occurring process happens too infrequently to be useful for commercial gene cloning.

Third, the Patent Office noted that a 1980 news aticle in the British scientific journal *Nature* reported that Robert B. Helling, one of the collaborators on the original gene cloning experiments, had declined to sign a disclaimer of inventorship. He was a visiting scientist at UCSF at the time.

Reimers noted that Stanford's patent attorney has judged Cohen and Boyer to be the sole inventors, but the attorney has requested further information about Helling's role in the research and would be prepared to consider any evidence he might provide.

A first patent, which covers the basic techniques of gene cloning, was the first of its kind to be issued in the United States in 1980. The second patent–the subject of the current office action–was filed in 1974 and covers products resulting from the technique.

Licenses have been granted by Stanford and UC to 73 industry firms on a nonexclusive basis, resulting in about $1.4 million income. Cohen and Boyer have waived their right to personal royalties from payments accrued from licensing of the patents.

No products are commercially available now, Reimers said, but insulin, a human growth hormone, and a vaccine for scours are expected to be available by the end of the year.

In addition to creating a powerful research tool for analyzing the complex workings of genes, the techniques make possible the construction of "bacterial factories" that can safely produce large quantities of compounds important in medical treatment.

Because bacteria theoretically could be engineered to produce almost anything created naturally by plant and animal cells, the techniques developed by Cohen and Boyer may have significant applications in industries as wide ranging as energy, chemicals, and agriculture.

VA gets Schizophrenia Biologic Research Center

Targeting for research a mental disease that cripples one fourth of all patients hospitalized in the United States, the Veterans Administration has established a Schizophrenia Biologic Research Center (SBRC) at the Palo Alto Veterans Administration Medical Center.

A five year grant of between $230,000 and $250,000 each year will fund the center. It will be directed by Stanford University School of Medicine researchers Philip A. Berger and Walton T. Roth, associate professors of psychiatry and behavioral sciences.

"Our goal is to classify schizophrenic patients using biological criteria," Berger said. The "biological criteria" to be researched at the SBRC include studies of biochemistry, pharamacology, and brain structure, as well as brain blood flow, psychological performance, and waking and sleeping electrophysiology of up to 100 veterans who are afflicted with schizophrenia.

For two decades researchers have been collecting bits and pieces of the biochemical puzzle that relates brain processes to behavioral disorders. Current theories suggest that an imbalance of one or more of the chemical messengers in the brain that include dopamine, serotonin, norepinephrine, and enkephalins may be associated with the devastating set of mental disorders collectively called schizophrenia.

A long term aim of the center, Berger said, will focus on using the biological classification system to predict which patients will respond best to which types of drug and psychological therapies.

Stanford's SBRC will share data and methods with an analogous center funded by the VA, to be headquartered at the Bronx Veterans Administration Medical Center in New York, Berger said, as well as with the several non-VA-affiliated schizophrenia research centers around the world.

The Hodgkin's disease success story

Stanford University Medical Center—home of some of the most advanced cancer research in the world—recently celebrated an anniversary with a scientific symposium updating progress in Hodgkin's disease and paying tribute to the hundreds of patients who helped make it possible.

The anniversary marked a full 20 years since Stanford launched a series of daring experimental trials to treat patients with both early stage and advanced Hodgkin's disease.

Until that time treatments, mostly with low voltage radiation, were palliative and the cancer was commonly believed to be incurable.

Today aggressive diagnosis and treatment can lead to better than 80 percent survival at five years for all stages of the disease, according to Stanford's published figures. Seventy-five percent of the patients are permanently cured.

Even more dramatic have been the cure rates in children, with a 96 percent survival rate at 11 years and with 93 percent of the children never experiencing a relapse.

The anniversary symposium was organized by two pioneers in the field of Hodgkin's disease, Dr. Saul Rosenberg and Dr. Henry S. Kaplan.

Dr. Vincent DeVita, director of the National Cancer Institute in Bethesda, Maryland, joined the pioneers.

It was DeVita who in the mid-sixties introduced the concept of clinical trials using a four-drug combination in patients with advanced Hodgkin's. And it was this combination called MOPP, which stands for the first letter of each drug—mustard, oncovin, procarbazine, and prednisone—that in later Stanford trials was used in conjunction with radiotherapy to produce even more dramatic results than those obtained by radiation alone.

But the real stars in the anniversary event, according to Kaplan and Rosenberg, were the patients. More than 500 of the 800 patients who took part in Stanford's clinical trials, and who are now cured of Hodgkin's disease accepted invitations to attend.

"Many of the best insights, the most productive insights that we have gotten along the way, came from observations in particular patients," said Kaplan. "They taught us new lessons which gave us the new ideas."

Drs. Kaplan and Rosenberg with patients Douglas Eads and Mary Vidal.

Kaplan began treating Hodgkin's patients with orthovoltage radiation and nitrogen mustard in an attempt to cure the disease while it was still localized in the mid-1950s.

Experience with a handful of cases suggested that radiation would do the job, but in half the patients, recurrences developed in the next chain of lymph nodes beyond the last one that had been irradiated.

Judging correctly that the effectiveness of radiation treatment was limited by the low-powered kilovolt X-ray equipment, Kaplan worked with Prof. Edward Ginston and a group of physicists at Stanford and helped develop the first megavoltage clinical linear accelerator to be made in the western hemisphere.

In the early 1960s Kaplan, using the linear accelerator, was able to deliver large tumor-killing doses of radiation—as high as 4,500 rads—deeper into the bodies of patients with advanced Stage III Hodgkin's. Treatments were spread over a period of up to four weeks and could be tolerated safely by the patients' skin.

The procedure Kaplan used is called total lymphoid irradiation. It involved giving massive radiation doses to nearly all the lymphoid tissues of the body, while protecting other vital organs from ill effects by the use of lead shields tailor-made for each patient.

Even though the patients with the advanced disease had no chance of cure, the idea of total lymphoid irradiation was criticized at the time by some of Kaplan's colleagues.

"Radiotherapists of that day had an almost superstitious fear of treating people both above and below the diaphragm with large doses of radiation," Kaplan recalled.

"But today above 40 percent of the patients treated 20 years ago with the so-called radical high dose are still alive. They represent the first group of Stage III patients ever cured."

Success required not only the accelerator, but also other developments. One was the histopathologic staging of the disease, accomplished at the Armed Forces Institute of Pathology by Dr. Robert Lukes. Another was lymphangiography, a diagnostic test developed in Europe. This test uses an opaque dye, injected into the small lymph channels of the feet, to highlight the lymph nodes in the abdomen in X-rays.

The Stanford group used lymphangiography routinely for all patients in their clinical trials as well as all other Hodgkin's patients.

"With these studies," said Kaplan, "we succeeded in showing that in probably 90 percent of all cases the disease disseminated as if it originated in a single site and progressed by what we call contiguous spread within the lymphatic vessel."

As a result, the Stanford collaborators developed an aggressive program against Hodgkin's disease that routinely included laparotomy and splenectomy as well as radiotherapy, with chemotherapy added in the advanced stages as a potential treatment ally.

An important discovery of the Stanford group was that the spleen in Hodgkin's patients was often a site of silent disease virtually undetectable by the lymphangiogram. Another finding was that the cancer spread by traveling from the spleen to the liver and possibly to the bone marrow.

In about 30 to 35 percent of the cases the extent of lymph involvement had been misdiagnosed. With laparotomy and splenectomy added to lymphangiography, the group was now able to determine accurately the extent of anatomic spread of Hodgkin's disease and then properly treat it with intensive megavoltage radiation.

As Kaplan was establishing the usefulness of the linear accelerator, Rosenberg was working with him and pioneering new developments in cancer clinical trials and chemotherapy as director of the Division of Medical Oncology.

Rosenberg's interests has been developing protocols to improve the treatment of lymphomas. He helped establish the value of the laparotomy and bone marrow biopsy techniques. Starting in 1968, he began testing with Kaplan the value and role of MOPP treatment in combination with radiotherapy in patients with Stage I, II, III of Hodgkin's disease, which proved beneficial for many patients.

In 1974 Kaplan and Rosenberg began new studies in which radiation and chemotherapy alternated, less toxic drug combinations were used, and new patterns of radiation and drugs were attempted in patients with the most advanced disease.

Among the less toxic drug combinations was PAVe, which stands for a three drug combination similar to MOPP, but better tolerated by patients.

Those trials were ended in 1980 and are still being evaluated, but it is clear, according to Kaplan and Rosenberg, that PAVe has proved to be every bit as good as MOPP, and more acceptable to the patients.

Kaplan and Rosenberg are now trying to perfect the powerful treatment programs with even less toxic drug combinations, without adversely affecting the cure rates.

Instead of MOPP and Pave, which almost invariably render males sterile and produce the risk of leukemia developing later, patients will be given a combination of the drugs vinblastine, bleomycin, and methotroxate, or VBM for short, after receiving radiation treatment.

Kaplan's and Rosenberg's major concern now is the patients' quality of life.

Modifications in techniques have prevented many complications from happening today. Children, for example, with Hodgkin's disease can now be treated without the impairment of bone and muscle growth induced by radiation and adding chemotherapy.

Recently, the group also reported that 20 of 26 women had succeeded in becoming pregnant following treatment for Hodgkin's disease at Stanford, and giving birth to healthy babies.

"It's a measure of our success that in a disease that was once invariably fatal, we now have the luxury of looking into (the quality of life)," Kaplan and Rosenberg said.

"If VBM works it would be a substantial contribution," Kaplan said. "If it proves not to be sufficiently effective, then we have MOPP in the background as a salvage regimen since its efficacy has already been well proved in patients relapsing after treatment of limited disease."

Gas bubbles aid diagnosis methods

Tiny gas bubbles swathed in gelatin are helping researchers at Stanford University Medical Center to take improved ultrasound scans of malignant tumors and brain abscesses.

Though tests in humans are still several years away, preliminary animal studies suggest that the bubbles of nitrogen gas may significantly increase the value of ultrasound as a diagnostic tool in noninvasively distinguishing between normal and abnormal soft tissues deep within the body.

To date, an effective contrast agent for the ultrasound scan–an exploratory tool favored by physicians for its convenience and apparent lack of side effects–has been elusive, according to Dr. Barbara Carroll, assistant professor of radiology, who leads one Stanford team that is refining and expanding the microbubble technique for clinical use.

Ultrasound waves produce images by bouncing high frequency sound waves off soft body tissues, and recording the reflections. The returning echoes are timed, analyzed, and converted to electrical signals that can be displayed as two dimensional images on a video screen.

Microbubbles have been recognized for a decade as the best enhancer of ultrasound imaging, because they reflect ultrasound waves 10,000 times more efficiently than an equivalent volume of liquid or solid particles.

But to increase clinical utility, the bubbles need to be uniform in size and shape, injectable in measured quantities, and deliverable at precise rates. Bubbles developed by a Bay Area research team in collaboration with Carroll, and other scientists, seem to meet each criterion.

The gelatin-encapsulated microbubbles (GEM) can be precision-made in sizes varying from 12 to 100 micrometers in diameter. Researchers can choose bubble size and density in the gelatin to complement the size of the vessels they wish to image.

A solid when refrigerated, the gelatin becomes a liquid at room temperature, and carries bubbles throughout the site to be scanned. The bubbles are large enough to stay within the vessels to be mapped (instead of migrating into surrounding tissue as liquid contrast agents do), but small enough to avoid vessel clogging. The gas dissolves within five to fifteen minutes, the smallest bubbles disappearing first.

Researchers currently are experimenting with alternatives to gelatin that could lengthen the life of the bubbles, permitting simple injection into peripheral veins, instead of catheterization of major vessels. Ideal bubbles would be small enough and long-lasting enough to traverse vessels from a vein in the arm or leg through the capillaries of the lung and out into a target organ before dissolving

Potential uses of the bubbles reach beyond tumor imaging. Researchers are experimenting with them in measuring blood pressure around the heart noninvasively.

Eventually, microbubbles conceivably could be used to carry chemotherapeutic agents or cancer-fighting antibodies to target tumors, sparing normal tissue, Carroll said, They might also be used to enhance ultrasound hyperthermia treatments of tumors.

SCIENCE NEWS

New drug helps cure severe acne

Oozing, bean-sized abscesses that covered his face and neck made it difficult for David Smith (not his real name) to make friends, stay in school, or even hold down a job.

"It became very hard not to have a desolate life," said Smith, 22, who for six years suffered from cystic acne, a severe form of scarring acne that resists traditional treatment and blights the skin of 350,000 people worldwide.

Today Smith's face is clear, after a several-month treatment at Stanford with daily oral doses of Accutane (13-cis retinoic acid), a drug approved by the Food and Drug Administration last spring and now available by prescription to the general public. Dr. Eugene Farber, chairman of Stanford's department of dermatology, has directed one of several research teams appointed to evaluate the effects of Accutane in clinical trials.

The drug is a retinoid, derived from vitamin A. Retinoids have been investigated for six or seven years for their ameliorative effects in various skin diseases and cancer. Accutane is the first of the group to gain FDA approval for acne treatment.

The drug's mode of action in the body is not completely understood, Farber said, although most research indicated that Accutane shrinks the oil secreting glands that tend to be large and overactive on the face, back, and chest of cystic acne sufferers.

Though a major boon to those with cystic acne, Farber cautioned, the drug carries a number of side effects such as chapped lips, dry nose and throat, and peeling palms, that preclude its use in the mild acne associated with puberty and nervous tension. "Cosmetic acne" responds well to milder, traditional treatments, he said.

Persons with heart disease, or women considering pregnancy within six months should not take Accutane, Farber said.

Autism chemically-caused, researcher believes

Autism may be related to an overabundance of a chemical messenger in the brain, believes Stanford's Associate Professor of Psychiatry Roland Ciaranello. He'll have the chance to test his theory with a three-year $150,000 award from the John Merck fund.

One of the first two recipients of a "John Merck Research Fellowship," Ciaranello said he will use the grant to expand an ongoing study of the biochemical roots of autism. The illness strikes one of every 2,000 children, and is often marked by debilitating social and emotional withdrawal, and severe language disability.

Research of the last decade has indicated that up to 40 percent of autistic children may have abnormally high blood levels of serotonin, a chemical messenger between nerve cells in the brain.

No one understands the significance of elevated serotonin levels, or how levels measured in the blood are related to levels in the central nervous system, Ciaranello said. Yet there is some proof to show autism may be biological, rather than psychological.

Since 1979, a team of researchers led by Ciaranello and Thomas Anders, professor of psychiatry, has been collecting biochemical and behavioral information from 106 autistic children in the Bay Area, but has lacked funds to complete a detailed analysis of the information.

The Merck fund grant will enable the scientists to increase the size of the group studied, Ciaranello said, and to compare the behavioral patterns and levels of serotonin and its byproducts in three groups: those with autism, those who are mentally retarded but now autistic, and normal children.

In a separate study, levels of endorphins, another set of brain chemicals implicated in pain perception and in several mental disorders, will be measured, he said, to test the theory that autistic children have a diminished response to pain.

BOOKS

Oleg Jardetzky

NMR in Molecular Biology
by Oleg Jardetzky and G.C.K. Roberts, Academic Press, 1981, $59.50

When Felix Bloch discovered the phenomenon of magnetic resonance at Stanford in 1945, I doubt he foresaw the enormous impact that NMR has had on science. From its initial application in physics to the measurement of the magnetic moment of the proton, NMR has become indispensable in all branches of chemistry and is now proving just as valuable in molecular and cellular biology, physiology, and medicine. This wide range of applications results from the versatility of the technique and its ability to provide unique data on the conformations, dynamics, and environments of molecules in solution. Although these studies are usually carried out *in vitro*, more recent applications of NMR are to the detection of signals from small biological molecules *in vivo*. These give information on the metabolic state of tissues and organs. NMR is also being applied to the processing of proton signals from H_2O, fats, etc. *in vivo* to obtain images of sections in the head and body. These already rival the pictures obtained by X-ray CT scanners.

Oleg Jardetzky has been a pioneer and major contributor to the field of NMR in molecular biology and has continued the tradition of NMR at Stanford. His co-author and co-worker, Gordon Roberts, is one of the leading exponents in Europe of biological applications of NMR. They have written a scholarly and critical account of NMR in molecular biology which will be a major source book for many years to come.

The book gives a thorough treatment of the theory and practice of NMR amply illustrated by many examples of NMR experiments which have led to

seminal observations in molecular biology. The strengths and weaknesses of the techniques are discussed in depth, in particular the difficulties of using high resolution NMR as "a low-resolution structural method." It is, however, the only solution technique capable of using the many structural parameters obtained from crystal structure determination of proteins and nucleic acids, and extending this static information to questions of melecular dynamics and interactions in solution.

Although the success of molecular biology is based largely on crystallographic determinations of biological structures at atomic resolution, this success has led to a widespread view that macromolecules are rigid in solution. It is now becoming apparent from detailed NMR studies that there is a wide range of flexibilities in proteins, from rapid flips of aromatic rings and sidechain motions in globular proteins to completely flexible proteins or segments of proteins. NMR is particularly suited to study the biological functions of flexibilities in macromolecules.

Major themes of the book stress the application of NMR techniques to studies of interactions and dynamics in biological systems; to studies of conformational transitions; the interactions of ligands with proteins; enzyme mechanisms; nucleic acids and nucleic acid-protein interactions and the structure and dynamics of membranes.

This book is very clearly written with a wide range of illustrations and an exhaustive list of references. It has been well-received by leading workers in the field and will be very useful to students, research workers, and newcomers to the field.

E. MORTON BRADBURY
Professor and Chairperson
Department of Biological Chemistry
School of Medicine
University of California, Davis
Davis, California

A job well done

The past few years have witnessed a period of unprecedented productivity on the part of the Medical Faculty Senate in matters of academic policy and school governance. The motivating force behind these developments has been Dr. Avram Goldstein, professor of pharmacology, who recently completed his third one-year term as Senate chairman.

I first came to know and admire Dr. Goldstein for his extraordinary teaching abilities in pharmacology in 1950 at the Harvard Medical School. At that time, his dedication to excellence was evident in his role as faculty advisor to many aspiring student-investigators. It has been my particular pleasure to renew a collegial relationship with him in the past few months since I became dean.

Three decades have done little to alter Dr. Goldstein's keen perception of the means to achieve and sustain academic excellence. We are sincerely appreciative of the endless hours he has devoted to the Senate on behalf of the Medical School. I am certain that the policy changes in curriculum and student affairs effected by the "Goldstein Senate" will be of particular interest to students, faculty, and alumni.

–Dominick P. Purpura, dean

I have had the privilege of leading the Senate through a period of significant change for the School. I have tried to be honest and open in working toward the goals I advocated four years ago. In large measure these have been accomplished, with the help of three Committees of Five and the consistent support of three Senates.

The changes accomplished in these past three years clearly represent the majority of the faculty's wishes. Most of the senate votes have been by an overwhelming majority. No action has been contested in a referendum of the electorate as provided for in both the old and the new Articles of Organization. And my leadership was reaffirmed twice by my reelection as chairman of the Senate. I hope my fair conduct of Senate business has commanded the respect of even of the minority who disagree with what we have done.

Here are the Senate's accomplishments:

• It has put in an official document the primary commitment of this School – providing a research-oriented medical education, and admitting and educating as many students as possible to pursue careers in research and teaching.

• It has adopted new Articles of Organization, which include the following features:

a. The Senate has been given full authority over admissions, curriculum, and evaluation of student performance. This authority is exercised through three standing committees, reporting to and removable by the Senate. These committees are efficiently small, with a greatly strengthened role of faculty relative to non-faculty participants.

b. Non-voting representation has been provided for our alumni and our voluntary clinical faculty.

c. Many procedural matters have been simplified and clarified, a system of Alternates has been established to ensure representantion in the Senate when an elected Senator is absent, and a preference ballot has been introduced for Senate elections.

• Following the recommendations of a special *ad hoc* committee on investigative medicine (Brown Committee) the Senate has:

a. Approved the principle of a tripartite curriculum in basic medical science, clinical medicine, and investigative medicine, and affirmed that "students graduating from Stanford should be expected to be competent in all three of these areas." We "expect all students to have command of the principles of investigative medicine essential for leadership in the practice of scientific design and interpretation, some knowledge of research methodology, and experience in a scholarly investigative project."

b. Recognized that "for most students, an additional year of residence will be required to accomplish significant research without neglecting important courses essential to the full implementation of an investigative medicine curriculum.

c. Recommended the institution of a single global tuition, which permits students to spend additional years in research or other activities without paying additional tuition. The administration accepted the recommendation.

d. Taken steps to expand the Medical Scholars Program and to initiate, in cooperation with the Alumni Association, the process of securing more funding for it. Recognizing the Medical Scholars Program's importance, we made the Medical Scholars Committee a continuing committee of the Senate rather than a subcommittee of the Courses and Curriculum Committee (CCC).

e. Recommended better central coordination in the Office of Student Affairs to improve the placement of students in research projects. The appointment of Dr. Robert Cutler as associate dean for

LETTERS

education effectively addresses the Senate's desire for better administrative implementation of its decisions, in this as well as in other areas of Senate responsibility.

• The Senate has instituted major changes in the admissions procedure as a result of extensive study by an *ad hoc* committee on admissions policy (Stryer Committee). Some important changes include:

a. Reducing the admissions committee to nine members – all full-time or emeritus members of the Academic Council, except for one upper-class student chosen by the Senate.

b. Incorporating a computer screen with appropriate weighting factors, to reduce the number of applications to about 2,000, while retaining a good representation of disadvantaged applicants. This group of 2,000 will be reduced further to 500 by careful folder review, supervised by the Director of Admissions. The 500 will then be acted upon by the Committee, using interviews and the advice of panels at their discretion. The new procedure should expedite admission of the most highly qualified applicants who are best suited to our research-oriented curriculum, reduce the high cost of the admissions process, and save faculty time through greater efficiency.

c. Giving special attention to the children of medical alumni, faculty and staff. "All other considerations being equal, preference will be given" to them.

• An *ad hoc* committee (Kendig Committee) reviewed and revised descriptive material sent out to applicants for admission, to make it better reflect the changes being instituted in our curriculum and student evaluation procedures.

• Following the recommendations of a special *ad hoc* committee on minority recruiting (Karasek Committee), the Senate has made a major commitment to the intensive recruitment of research-oriented, academically qualified minority students. The Senate's specific recommendations include establishment of a research scholarship program to meet the special needs of minority and disadvantaged students, and the appointment of an assistant dean for minority affairs. The Dean has responded favorably to the Senate's sense of urgency concerning this need, which requires a serious commitment of energy and funds to achieve success.

• The Senate has re-instituted a core of required clinical clerkships, establishing a requirement for all students to become competent in Basic CPR and Advanced Life Support, and setting the CCC to work developing a required Basic Medical Sciences curriculum. Thus, the Senate has effectively put an end to the absurd excesses of the totally elective curriculum, while retaining curricular flexibility. It also affirms that individual exceptions to the graduation requirements may not be granted except by the Senate, acting on recommendation of the Committee on Student Performance.

• It has established a system of recognizing excellence by awarding general honors for overall exceptional performance, and special honors for outstanding research accomplishment at graduation.

• The Senate has assumed full responsibility for the orientation program for incoming students, as part of its responsibility for the curriculum. Through the CCC, a faculty-freshman preceptorship program was established to assist new students to take maximum advantage of the Stanford environment. This is a modification of a pilot program established by the Senate two years ago.

• The popular school-wide SMASH lectures, established two years ago, are continuing under the joint aegis of the Senate, SMSA, and the Dean.

• The Senate improved the environment in which it functions as a legislative body for the faculty, rather than as a mass meeting of the Stanford medical community. A calm and deliberative atmosphere has resulted, in which the business of the faculty has been debated and acted upon efficiently.

In closing this report, I should like to ask for your continued support in ensuring that the School continues on its present course. Faculty governance, through the Senate, greatly influences what kind of school this will be. There are honest disagreements among the faculty concerning many of the key issues. This is entirely appropriate. It is also appropriate to elect as Senators those colleagues who share one's views about these important matters.

I thank you for the opportunity to serve the School and its faculty these past three years. I am happy to have been able to contribute something to sustaining and enhancing the academic strength of this great institution.

AVRAM GOLDSTEIN, M.D.
Stanford, Calif.

DEATHS

Robert Foster Merchant, Sr., M.D., class of 1946. Died in June, in Belvedere. Merchant was an ophthalmologist for 32 years, and was a partner of Kaiser Hospital in Oakland. He was a member of the San Francisco Medical Society, the California Medical Association, and the American Medical Association. He was also a member of Phi Rho Sigma, Stanford Alumni Association, and was active in the San Francisco Council of Boy Scouts of America. He is survived by wife Eleanor; sons Sheldon and Robert; daughter Karen Anne Lang; and sister Phoebe Huber.

Jack V. Chambers, M.D., class of 1936. Died in June, in Sacramento. He was a surgeon in Sacramento for 35 years. Chambers was a member of the Sutter Hospital Board of Trustees for 19 years, and was president of the Sacramento Medical Society in 1955. He was a member of the Sacramento County, California, and American Medical Associations. He was also a member of the Pan Pacific Surgical Society, and was a fellow of the American College of Surgeons. He is survived by wife Eleanor; son Alan; daughter Charlene; brother Robert, sister Ruth Howard; and two grandchildren.

Emmet L. Rixford, Jr., M.D., class of 1930. Died in August, in Tiburon. He was a prominent surgeon, and former president of the local chapter of the Oceanic Society, as well as a member of the American College of Surgeons, the San Francisco Medical Society, and the California Medical Association. His father, Emmet L. Rixford Sr., was chief of surgery at Stanford for 36 years. He is survived by wife Miriam; sons Emmet and Charles; sister Mary; a brother Henry; and six grandchildren.

Mary Beulah Gibbons Allen, great-granddaughter of co-founder of the Medical School. Died in June in Greenbrae. Her grandfather; Dr. Henry Gibbons, Jr., was dean of the Medical School for 45 years. She is survived by son Wyatt; daughters Ruth A. Barker, and Margery A. Prestage; sister Margaret Molarsky; and four grandchildren.

COMING EVENTS

Continuing Medical Education for the Practicing Physician

Multidisciplinary Courses

offered by the Office of Postgraduate Medical Education

February 21-25, 1983
"Basic Science for Clinicians," at Stanford. For clinicians who desire a comprehensive review of basic science and an expanded knowledge of molecular biology. Tuition–$365.

February 26 and 27, 1983
"Basic Neuroscience," at Stanford; tuition–$250.
"Biobehavioral Science for Psychiatrists," at Stanford; tuition–$250.
"Immunology," at Stanford; tuition–$250.

Registrants may wish to enroll in one of these concurrent weekend programs in conjunction with the "Basic Science for Clinicians" symposium, which will be held during the preceding week. For more information, please return the form below.

March 10-13, 1983
"Clinical Management," at The Lodge at Pebble Beach. This non-lecture course will update knowledge and sharpen clinical skills in the management of important problems encountered in practice. The format will be that of problem-solving seminars in small groups. Registrants may stay at The Lodge or at other nearby hotels. Tuition–$250.

April 30-May 7, 1983
"Management of the Surgical Patient," at the Mauna Kea Beach Hotel, Kamuela, Hawaii. For physicians–both surgeons and nonsurgeons–who participate in the care of surgical patients. Tuition–$365; room deposit–$225.

July 9-16, 1983
"Cardiovascular Medicine and Surgery: An Advanced Course," at the Mauna Kea Beach Hotel, Kamuela, Hawaii. For physicians who care for patients with cardiovascular disease. This course will deal with the most recent developments of clinical significance in cardiovascular medicine and surgery. Tuition–$365; room deposit–$225.

Other Postgraduate Courses

offered by Departments and Divisions of Stanford University school of Medicine

March 24 and 25, 1983
"Diseases of the Urinary Tract," by the Division of Urology at Rickey's Hyatt Hotel, Palo Alto. Contact the Division of Urology, S-287, Stanford, California 94305; (415) 497-5746.

March 23-25, 1983
"Current Concepts in Surgical Pathology," by the Department of Pathology, at Stanford. Contact L. Culligan, Department of Pathology, P-2020, Stanford, California 94305; (415) 497-7211.

Clip and mail to

OFFICE OF POSTGRADUATE MEDICAL EDUCATION
Stanford University School of Medicine, Room TC-129, Stanford, California 94305/Telephone (415) 497-5594

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STANFORD UNIVERSITY MEDICAL CENTER

Annual Report 1982

A LOOK BACK: A LOOK FORWARD

by Lawrence G. Crowley, MD
Vice-President for Medical Affairs

1981 in retrospect

When I try to identify the most significant events at Stanford University Medical Center last year, I am hard-pressed to decide among many: the advances made by faculty in understanding the structure and function of DNA; the dramatic improvements in treatment resulting from clinical research; our success in attracting two outstanding men to head the School and the Hospital; and a variety of other newsworthy items.

That these accomplishments spread across the triad of our responsibilities—teaching, patient care, and biomedical research—speaks to the character of this place.

Let me start with the two appointments: Dr. Dominick P. Purpura was recommended as dean of the School of Medicine from a field of more than 300 applicants by a search committee including faculty, alumni, and medical students. The unanimity of their recommendation of Dr. Purpura is a remarkable tribute to him from a community marked by much diversity of interest and style. A recent campus interview with Dr. Purpura is reprinted on page 6.

A complementary appointment for the director of the Hospital, Sheldon King, means that we have now rounded out the leadership of the Center. Mr. King came to us in November from the position of executive director of the hospital and clinics at the University of California Medical Center in San Diego, having served as an administrator earlier at several large New York teaching hospitals. His impressions of the Hospital here and a glimpse of his plans appear on page 7.

Both Dr. Purpura and Mr. King also serve as associate vice-presidents for medical affairs.

Dr. Purpura has said that he believes deeply that research—both fundamental and clinical—is vital in a medical school and university hospital, a position that underlines the stance of our faculty as to their prime educational objective. They have recently reaffirmed that the goal of the School is to develop in students the capacity for leadership in the clinical practice of scientific medicine and to provide students opportunities to prepare themselves for careers in research and teaching.

The School's research programs are extensive. In 1981, expenditures for research ran to more than $47 million. Projects range from investigation of the most fundamental questions involving living organisms to the search for improved treatment of human disease. Obviously, there is teaching in laboratories at both ends of the spectrum.

But the research has many more educational opportunities than those offered by the curriculum. Under a system of preceptorships, initiated by the faculty two years ago, preclinical students are encouraged to propose a research topic for an independent project under the supervision of a faculty member; about one-quarter of the faculty have made themselves available for these projects. Deemed successful by students and faculty alike, the program is now funded by the Medical Alumni Association and renamed "Alumni Scholars." The alumni were treated to presentations by some of the young scholars at their annual meeting last June. Between the Alumni Scholars program, the Medical Scientist Training Program (culminating in both the MD and the PhD degrees), and the PhD graduate program in cancer biology, almost half of our students participate in faculty-supervised research during their medical school years.

A second, more informal mechanism for scientific learning pleases me greatly: a series of lectures known as SMASH (Stanford Medical and Scientific Highlights) has filled Fairchild Auditorium to overflowing on alternate Friday afternoons. The speakers range from our most senior, most widely acclaimed stars to young and brilliant members of junior faculty. A time for questions follows the presentation, then faculty, students, and research workers from all over the center join over refreshments for a social hour.

Never was an acronym more apt: the series is a SMASH hit.

Certainly I cannot talk about research at Stanford without reminding you that "the golden years" of genetics (to quote Arthur Kornberg) owe much of their luster to genetics research here. Beginning with Dr. Kornberg's initial success in synthesizing biologically active DNA in the test tube, a long line of Stanford investigators have developed and refined new recombinant DNA techniques and have brought other scientists closer to understanding "how cells develop, differentiate, and die" in Kornberg's words.

Stanford names have become synonymous with the burgeoning field of genetic engineering: Paul Berg, who won a Nobel Prize in 1980 for his "fundamental studies of the biochemistry of nucleic acids with particular regard to recombinant DNA"; Stanley Cohen, chairman of the Department of Genetics, who with Herbert Boyer of UCSF devised the initial technique for basic gene splicing and cloning; Stanley Falkow, Robert Lehmann, David Clayton, David Hogness ... the list goes on and on.

A recent issue of *Healing Arts,* produced by the Medical News Bureau, contains a comprehensive review of

these and other studies in the field of genetics at Stanford.*

At the other end of the spectrum is the clinical research in which faculty physicians follow their laboratory findings through to patient treatment. Our most dramatic example of that transfer of information last year came with the four successful transplantations of heart-lung units to patients suffering debilitating heart disease as a result of inadequate lung function. The surgical team, Dr. Bruce Reitz, Dr. Norman Shumway, and others, used techniques that were perfected in years of cardiovascular surgery in both patients and laboratory animals.

Perhaps more importantly, they drew on knowledge they have gained about rejection and infection—the twin problems of transplantation. Dr. Reitz gives a new drug, cyclosporin A, much of the credit for the successful course of the patients' recovery, a drug that has been tested here for more than two years.

Other examples go on continually in the Hospital and the outpatient clinics. In the Clinical Research Center, for example, Dr. Ronald Levy, working with Richard Miller, David Maloney, and Roger Warneke, has reported good results from treating a patient with advanced B-cell lymphoma with a highly specific monoclonal antibody. He and his group are cautious about claims for the method, but believe that it is a promising avenue for further testing. Also in the CRC, Dr. Gerald Reaven is testing an artificial pancreas with diabetic patients. Dr. Samuel Strober, using total lymphoid irradiation (TLI) perfected by Henry Kaplan for cancer treatment, has treated a number of seriously handicapped patients with rheumatoid arthritis with TLI with promising results. And this May, Dr. Kaplan, Dr. Saul Rosenberg, chief of oncology, and their patients will celebrate the twentieth year of clinical trials for patients with Hodgkin's disease—the evolution of treatment that has turned around an almost inevitably fatal disease.

1981 was a good year. By many measures—research volume, faculty honors, quality of students, and new faculty appointments—I believe that we upheld the University's standard and our own for vigor and dynamism.

The outlook for 1982

Now, there is a great deal of speculation about the impact on the medical center of cutbacks in federal funding. It will affect us in four areas.

First: *Student financial aid.* Eighty percent of our medical students need financial aid; annually, it totals nearly $4 million. Last year, 43 percent of that amount went to them as loans.

We base distribution of medical student loans solely on need. All those who qualify receive health profession or graduate student loans, though sometimes in amounts lower than ideal. In recent years, the School has received only 10 to 20 percent of its request for new loan money because of a general trend away from supporting health professions education.

*Write to: News Bureau, Stanford University Medical Center, Stanford, CA 94305, if you would like a copy of this *Healing Arts*.

Across the board, these student funds are being decreased. Cal-State Fellowships have been reduced by half; no new candidates are being accepted for the National Health Service Corps; and one of the few federally funded scholarships for Native Americans has been eliminated.

There are now two options before the Congress modifying the Guaranteed Student Loan Program (GSLP). One would eliminate all loans to graduate students; the other would change graduate student eligibility levels. Our students have used this program heavily (more than $1.2 million in 1980/81) because the interest rate is only 9 percent, and interest is subsidized while the students are in school. Two less attractive alternatives will be available to medical students. One, an existing program, is Health Education Assistance (HEAL), which likely will have a cap put on it by Congress. The second, a new program, is called ALAS (Auxiliary Loans to Assist Students). Both kinds of loans will carry a higher interest rate than GSLP, with interest commencing and compounding immediately.

Despite recent publicity on poor loan repayment for Health Professions Loans (HPSL) on the national scene, Stanford students do very well on repayment. Based on their new methods used to compute delinquency, Stanford has a less-than-1 percent delinquency rate.

The second important area of federal spending cuts is that of *faculty research.* As a result of the announced cutbacks in research funding, the School of Medicine will experience a potential reduction of approximately 4 percent in funding for ongoing federally sponsored research projects. This translates into $2 to $3 million reduction in funds for these projects.

We are not alone, of course, in facing this dilemma. President Donald Kennedy, addressing the Academic Senate on January 8, spoke about the ways University research generally will be affected. I quote the portion of his remarks that pertained to agencies involved in biomedical research:

"The National Institute of Health (NIH) reduced 30 Stanford continuing research grants 12 percent. It has since announced a partial restoration of the cut, lowering the final grant reduction figure to 4 percent. The agency has also apparently decreased the number of new grant awards....

"The National Science Foundation (NSF) has forced researchers working on continuing grants to reduce previously agreed-upon budgets and has delayed the funding of its new grant awards....

"These agency decisions have handicapped the Stanford community in various ways. First and foremost, by limiting the number and value of research awards, they have reduced the quantity and, potentially, the quality of basic research performed. As is the case with high energy physics research, basic research in other areas is not conducted with a commercial application in mind, therefore the private industrial sector has little incentive to fund it, and, generally, does not. Less than 3 percent of Stanford's total research budget comes from private industry. Moreover, universities, as nonprofit institutions, are without the funding reserves maintained by the private sector to protect against sudden funding losses. As a result, reduction in federal basic research funding means a reduction in basic research. And as it is widely acknowledged that basic research is utterly essential to our nation's long-range objectives for economic progress and national security, any loss of basic research undermines the national efforts undertaken to achieve the goals."

Some technical staff have already been laid off, although investigators are trying to maintain their research staffs by reducing costs in other areas such as travel and supplies, since reduced staff clearly means a slow-down in achieving the goals of a particular research program.

The Faculty Practice Program (FPP) will also be affected. The purpose of the FPP is to support the clinical training of medical students in their third and fourth year of training, as well as postgraduate training for resident house staff and postdoctoral fellows. The proposed reduction in professional fee reimbursement for federal- and state-sponsored patients will have an adverse effect on our ability to maintain the same level of training.

Finally, *The Hospital.* Almost half of the patients in the Stanford University Hospital participate in Medicare, Medi-Cal, or other government-sponsored, cost-reimbursement programs.

When these programs began in the 1960s, hospitals were reimbursed for the *allowable* costs of providing care to covered patients. In the past few years, however, Medicare and Medi-Cal have cut their payments to levels that are generally below the Hospital's costs.

Our 1981/82 budget predicts a $6 million decrease in reimbursement from the Medicare formula used earlier for payment. To recover that projected loss, we must pass it along to patients who pay their own bills or have private insurance. This year, that loss accounted for 8 percent of our September increase in patient charges. In the past, the government has sometimes recognized that teaching hospitals have materially higher costs than do nonteaching hospitals because of the greater intensity of care required and have adjusted their reimbursement limits accordingly. We will apply again for relief based on the fact that the percentage of our patients who need critical care is much greater than that for the average hospital and is rising. Stanford Hospital's routine nursing hours per day, to cite only one cost factor involved, run about 42 percent higher than those of the average hospital of its size.

Unfortunately, we have indications that even greater cuts will be made in Medicare reimbursement formulas before the end of 1982.

How do we intend to deal with all this?

President Reagan suggests that private gift sources will pick up the differences in public funding levels, and we certainly plan to explore that solution.

This is a private, independent institution, and we have been blessed by an extraordinary level of assistance by donors over the years; last year, in fact, medical school gifts and nongovernment grants totalled $23 million by August 31. It is ironic that the Economic Recovery Tax Act of 1981 may mean that we can expect less help from these sources. A study conducted for the Urban Institute estimates that individual contributions to charitable organizations will drop $18.3 billion between 1981 and 1985 as a result of the act. Looking at past giving patterns, the study projects that charitable giving to colleges, universities, and hospitals will decrease 3 percent in constant dollars over the next few years.

Our fund-raising priorities may shift slightly with this projection in mind, hoping that particularly popular uses of gift funds may generate a higher level of gifts despite that forecast. We will put new emphasis on student financial aid, for example, in order to identify gifts for loan and scholarship funds. Last year, the Kaiser Family Foundation made grants to thirteen private medical schools to match gifts for student loan and scholarship funds. It was a splendid gesture of support; moreover, it was a creative way to encourage alumni giving.

Another area will be research seed funds in fields that interest our faculty—and donors. We believe that by testing the feasibility of promising research avenues through gift funds, investigators—particularly young ones—will be in a better competitive position for obtaining the limited funds available from NIH, NSF, and other federal agencies.

So far as the Hospital is concerned: I simply see us keeping to a holding pattern. We will certainly continue to negotiate with Medicare officials on the question of reimbursement limits. Over the past year, Hospital managers have succeeded in moderating the rate of growth in Hospital expense by increasingly efficient methods. Nonetheless, the budget for 1981/82 is higher than that for the previous year.

Generally we will continue to restrain growth and will be prepared to pare back if necessary throughout the Center, knowing that when the economy improves, our job of maintaining the excellence of which we are all so proud, will be easier.

DOMINICK P. PURPURA, MD:

A Conversation with the New Dean of the School of Medicine

In a recent interview, Dr. Dominick P. Purpura, dean of the Stanford School of Medicine, discussed some of the thinking that will guide him as he meets his new assignment. He was full of thumping enthusiasm as he leaned back in a swivel chair, swinging around at times, waving an arm to stress a point.

"My most important concern," he said, "is to find the way to becoming an effective dean, not necessarily loved, but effective, and to meet some of my own goals—making the School as good as it should be and perhaps even better.

"I've dealt with many deans in my 29 years of academic life, but I never felt they really understood the problems of basic scientists and clinicians as I do.

"Everybody in academic medicine says this of deans. So the novel challenge that I face now is: can I really do the job that I have always complained about?"

Purpura is convinced—and has said so on other occasions—that to be a satisfactory dean, one must do at least three things:

"First, he must be aware of not necessarily the concensus but the direction towards excellence that a faculty wants to take," he said.

"Faculties often do not know the way entirely, and the dean can facilitate that move."

He believes that because of his own experience as a scientist articulating those needs for years, perhaps he can now listen to the faculty better than a "professional" dean.

"Second, a dean must be aware that a School of Medicine is concerned with the teaching of medicine," Purpura said. "Too often some of the best medical school faculties have too remote a relationship with medical students and that leads to disillusionment for both students and faculty.

"I think it's important to put the medical student back at the central focus of concern in a medical school.

"Third, of course, apart from leading and guiding people towards their own ascertainment of excellence, is to recognize that a medical school, and Stanford in particular, is not on Neptune or Uranus.

"If the School were on an isolated planet or the Mojave Desert, there'd be no problem. It would be so contained that we'd develop in any way we saw fit. But the School is located in this community, and it must develop its relationships in a proper and mutually beneficial way."

A graduate of Columbia College (1949) and Harvard Medical School (1953), Purpura completed his internship and part of his residency training at Columbia-Presbyterian Hospital in New York. He joined the faculty of neurological surgery at Columbia's College of Physicians and Surgeons in 1956 as a research physician. In 1967 he became professor and chairman of the Department of Anatomy at Einstein, advancing to his present academic post in 1974 when he founded the Department of Neuroscience.

Since 1972, Purpura has also directed the Rose F. Kennedy Center for Research in Mental Retardation and Human Development at Einstein. The Center is an important institute, with both basic and clinical functions involving a number of medical school departments.

His career is replete with honors, including a number of teaching awards, and the Lucy Moses Prize in Basic Neurology as well as the William G. Lennox Award of the American Epilepsy Society. He is president-elect of the Society of Neuroscience, and editor-in-chief of *Brain Research*, a major journal in the field, which he will continue to edit.

Purpura believes deeply that research—both fundamental and clinical—is absolutely vital in a medical school and university hospital. He gives examples from his own experience.

"I see the basic data coming out of neuroscience research as the only hope in our being able to understand the pathophysiology of developmental failure," he said.

He and his colleagues have applied this knowledge and techniques to the study of abnormal nerve cell development related to mental retardation.

Specifically he was one of the first to demonstrate that there were disorders of dendrites and dendritic spine structure in the brains of children with profound mental retardation. Most communication between nerve cells occurs through structures called synapses onto dendrites, threadlike extensions on the surface of nerve cells.

Purpura determined that the brains of children who are mentally retarded with no known cause such as chromosomal abnormalities had nerve cells virtually devoid of the typical patterns of spine synapses that normally develop before birth.

He began to suspect that this problem was the basis for the lack of cognitive development, and later these findings have been confirmed by others.

"I went into research in medical school because it was as joyful as a hobby," he said. "And I have been successfully funded for 30 years to practice my hobby. What a privilege and responsibility!

"That's what in fact a good deal of basic research is for the individual—an exploration of the joy of discovery and doing things. For a while I may give up some of that joy, but I think it's a minimal sacrifice."

by Spyros Andreopoulos
Excerpted from *Stanford M.D.*
Fall 1981

SHELDON KING:

An Interview with the New Hospital Director

Sheldon King, director of Stanford University Hospital and associate vice-president for medical affairs, is clearly at home in the academic world that surrounds his hospital environment. "I've been involved in health care policy formation at the state and federal levels, but that interest has been secondary to hospital management. I believe that I understand what it takes to make a large teaching hospital run effectively. That's what I'm here for, and that's what I'm interested in professionally. But I always keep in mind the unique characteristics of a teaching institution. Teaching helps me to understand the academic interest better, and working with students is something I enjoy."

King has spent all his working life in teaching hospitals, starting as an administrative intern at Montefiore Hospital in his native New York City. Over time, he says, he has come to understand that most of the progress in American medicine takes place in teaching hospitals.

His current focus is a 663-bed hospital, which must delicately balance the research and teaching needs of a university with the patient care needs of an urban community. Among other things, King's job is to help keep that balance.

Until he came to Stanford University Hospital last November, Sheldon King served for almost ten years as director of hospital and clinics at University Hospital, University of California Medical Center in San Diego.

"At the risk of sounding immodest, my main accomplishment was assembling and leading an administration that worked with faculty to turn that facility from a county hospital into a significant teaching hospital," he says. Then it was time to move on.

"I think that when you have been at any institution for a significant period, you must take a very careful look and decide whether there is any point in continuing there. You tend to become less creative if you stay after the major challenges have faded .... Stanford was one of the places where I felt I could live and work. And when the opportunity presented itself, I took advantage of it."

Since he's only been on the job since November, King admits a conflict between the need to study and learn his new arena and a desire to move ahead. He acknowledges that he is too recently at Stanford to have decided on all the specific policy directions in his new assignment. But he emphasizes that his general views on how teaching hospitals should be run are firm on such issues as the role of the institution in the community, the relationship of a hospital with its doctors, and the issue of providing balanced health care programs.

On the latter, King is certain that Stanford can successfully combine its role as a tertiary or highly specialized facility with its role as a community hospital. He believes that the Hospital Modernization Project will enable the Hospital to perform both functions more effectively and points to the expansion of the operating rooms from 16 to 24 as an example of that sweeping improvement project.

Key to providing a balance of patient and research services is a harmonious relationship between the fulltime faculty and local physicians in private practice who treat their patients at Stanford. "A board committee is looking at access now, and I think that is going to be an extraordinarily important committee."

Another issue, says King, is to increase patient amenities to ensure that Stanford will continue to be a hospital of choice for the community. "I'm not talking about providing lobster and filet mignon at every meal, but I am talking about providing an improved environment.

"Of course, until the modernization program is completed, the Hospital is limited physically. It doesn't take more than a glance to tell you that the patient-care rooms are too small. How much can we do about that now? I don't know yet, but there are some basic things that would make a lot of difference to patients.

"The plant needs freshening, a general sprucing up. A number of the service areas need work; that's where some emphasis will be placed. But our task involves more than physical change; it involves the way we relate to patients. For example, the hospital bill is difficult to understand. It should not cost more to produce a bill that patients can understand than one they can't. Is that a patient amenity? I think it is."

King would seek to attract new kinds of patients, including the elderly who make up an increasingly larger proportion of both the nation's and the Peninsula's population.

And, in a second category, "We're going to need to relate to HMO (health maintenance organizations, prepaid plans) populations in different ways than we do now. I don't know what all the conditions are, but it's clear that in a competitive market with the continued emphasis on prepayment plans and on buying the least expensive comprehensive plan possible, we'll be obliged to get into that business either cooperatively or independently. That's an issue for both the faculty and the Hospital."

King also cited Stanford faculty and staff as potential patients. "We ought to make this place so attractive to them for care that they don't go anywhere else. I don't know that we do that now .... Again, it's really an issue of balance and an agreement on goals and directions. After we determine these, we must proceed toward our objectives in an integrated and measurable way. That's simple to say, but I've not experienced it to be simple to do. That's the challenge, and I wouldn't have come here without challenges. It's stimulating to come to a hospital that's not in crisis, where the opportunities lie before us."

Mike Goodkind
Medical News Bureau

The Stanford University Hospital: 1987

Stanford University Hospital is planning a $114 million, five-year program of modernization and construction that will improve the comfort of hospitalized patients and the efficiency of the medical and support staffs.

The principal components of the project are:

...construction of a new patient wing to house about 160 patients; a diagnostic and treatment wing with a surgical suite and the necessary support facilities; and consolidated clinical laboratories.

...completion of the unfinished space in the south wing, built in 1977.

...renovation of existing Hospital space as it is vacated.

The project will not provide additional licensed beds, but, when it is completed, all of the present licensed beds will be vastly more functional and comfortable than they are now.

If approvals from state agencies follow the timing expected, construction can begin in early 1983 and should be completed in the spring of 1987.

The project will be funded by a combination of gifts, hospital capital reserves, and bonds.

Project Director: Elvia Fernandez Garwood
Architects: Naramore, Bain, Brady & Johanson
Construction Management: Morse/Diesel

Hospital Administration

Lawrence G. Crowley, MD
President

Sheldon S. King
Executive Vice-President and Director

James F. Silverman, MD
Chief of Staff

Michael Eliastam, MD
Deputy Chief of Staff

Philip G. Rector
Director, Facilities (SUMC)

David I. Sakai
Director, Finance

Donald R. Thomas
Director, Personnel

Mary Catherine Krawec
Associate Director

Donald G. Utt
Associate Director

Duane D. Walker, RN
Associate Director
Director, Nursing Service

William W. Arnold
Assistant Director

Ronald W. Hill
Assistant Director
Director, Health Services Planning

Nancy Madsen, RN
Assistant Director
Associate Director, Nursing Service

Carole Runyan Price
Assistant Director

Roland S. Merchant
Special Assistant to the Executive Vice-President and Director

Jeanne D. Kennedy
Director, Community Relations

Board of Hospital Directors

The Stanford University Board of Hospital Directors is appointed by the general members of the Hospital corporation, who also serve on the Board of Trustees of the University.

Donald Kennedy, PhD, *Chair*
Walter L. Arons, MD
William E. Ayer, PhD
Peter S. Bing, MD
Lawrence G. Crowley, MD
Conrad F. Gullixson
Sheldon S. King
Kenneth L. Melmon, MD
William F. Massy, PhD
Linda R. Meier
Dean Morton
Nancy Barry Munger
Dominick P. Purpura, MD
Frank H. Roberts
Geraldine Steinberg
David J. Stone

Medical School Deans

Dominick P. Purpura, MD
Dean, 1982–

Associate Deans

Franklin G. Ebaugh, Jr., MD
Veterans Administration Medical Center, Palo Alto

David H. Mendelow, MBA
Administration

Edward Rubenstein, MD
Postgraduate Medical Education

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James F. Silverman, MD
Clinical Affairs

John P. Steward, MD
Student Affairs

John L. Wilson, MD
Faculty Affairs

Medical Board

James F. Silverman, MD,
Chairman & Chief of Staff
Robert L. Hill, MD,
Medical Staff President
Lawrence G. Crowley, MD
Sheldon S. King
Duane D. Walker, RN, MS
Malcolm A. Bagshaw, MD
Melvin Britton, MD
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Eugene M. Farber, MD
Anthony Felsovanyi, MD
William R. Fielder, MD
Thomas A. Gonda, MD
William E. Hancock, MD
W. LeRoy Heinrichs, MD
David Korn, MD
C. Philip Larson, MD
Burt F. McDowell, MD
John T. Mehigan, MD
Kenneth L. Melmon, MD
Brian T. Paaso, MD
Jonathan Parmer, MD
David A. Prince, MD
Irving Schulman, MD
Norman E. Shumway, MD
Edward B. Solomon, MD
Louis Zamvil, MD

CLINICS

The Stanford University Clinics, the base for the Medical Center's Faculty Practice Program, represent the private outpatient practice of the School of Medicine's full-time faculty. In essence, the Clinics are a university-based, multispecialty group practice. Their structure is different from that of other medical clinics in the area only in that they also serve as a classroom for the School's medical students, residents, and postdoctoral fellows.

Patients are accepted in the Clinics by referral from the primary care physician; in many clinics, patients may request appointments directly. For information about appointment procedures, call (415) 497-5631.

Clinic Administration

David H. Mendelow
Administrator, Stanford University Clinics
Associate Dean for Administration, Medical School

Ken Jensen
Controller, Faculty Practice Program

Vera Waechter, RN
Manager, Clinic Patient Services
Director, Clinic Nursing

Faculty Practice Plan

EXECUTIVE COMMITTEE, 1981/82
Kenneth L. Melmon, MD, *Chairman*
Lawrence G. Crowley, MD
David Korn, MD, *Vice-Chairman*
C. Philip Larson, MD, *Treasurer*
David H. Mendelow, *Secretary*

ALTERNATES
Malcolm A. Bagshaw, MD
John A. Collins, MD
Thomas A. Gonda, MD

Clinics

Anesthesia
C. Philip Larson, MD, *Chairman*
- Pain Service

Cardiovascular Surgery
Norman E. Shumway, MD, *Chairman*
- Cardiovascular Surgery
- Cardiac Transplant
- Peripheral Vascular Surgery

Dermatology
Eugene M. Farber, MD, *Chairman*
- General Dermatology
- Contact & Industrial Dermatitis
- Cutaneous Surgery
- Dermatologic Psychiatry
- Diseases of the Mouth
- Microscopically Controlled Fresh Tissue Surgery
- Mycology
- Pediatric Dermatology
- Plethysmography
- Podiatry
- Nail
- Psoriasis Day Care Center
- Psoriasis PUVA Therapy
- Psoriasis Research
- Skin Cancer

Gynecology & Obstetrics
W. LeRoy Heinrichs, MD, *Chairman*
- Colposcopy
- Endocrine & Infertility
- Normal Prenatal
- Oncology
- Routine Gynecology
- Special Obstetrics
- Stilbestrol Exposure
- Ultrasonography

Medicine
Kenneth L. Melmon, MD, *Chairman*
- General Medical
- Stanford Medical Group
- Hypertension
- Allergy
- Immunology
- Cardiology
- Preventive Medicine
- Endocrinology
- Gastroenterology
- Genetics
- Hematology
- Infectious Disease
- Nephrology
- Oncology Day Care Center
- Chest

Neurology
David A. Prince, MD, *Chairman*
- Adult/General Neurology
- Multiple Sclerosis
- Pediatrics/General Neurology
- Pediatric Neuromuscular
- Pediatric Neuro-oncology

Pediatrics*
Irving Schulman, MD, *Chairman*
- General
- Allergy/Pulmonary
- Birth Defects
- Cardiology
- Dermatology
- Endocrine
- Gastrointestinal
- Genetic Counseling
- Genetic Metabolic
- Hematology
- Oncology
- Orthopedics
- Pediatric Surgery
- Premature Follow-up
- Renal
- Rheumatology/Immunology
- School Functions
- Spina Bifida
- Youth

Psychiatry
Thomas A. Gonda, MD, *Chairman*
- Adult Inpatient Services
- Adult Outpatient General
- Adult Outpatient Consultation/Liaison
- Alcohol Treatment
- Biofeedback & Stress Reduction
- Comprehensive Care
- Cancer Group Therapy
- Sleep Disorders
- Child & Adolescent

Radiology
Malcolm A. Bagshaw, MD, *Chairman*
- Nuclear Medicine
- Radiation Therapy

*Pediatrics clinics, except for Genetic Counseling, are located at Children's Hospital at Stanford.

Surgery
John A. Collins, MD, *Chairman*
- General Surgery
  - Breast
  - Endocrine
  - Gastrointestinal
  - Thoracic
  - Peripheral Vascular
  - Enterostoma Therapy
- Ear, Nose & Throat
  - Audiology
- Neurosurgery
- Ophthalmology
  - Contact Lens
  - Corneal External Disease
  - Glaucoma
  - Neuro-ophthalmology
  - Retina
  - Retinal Electrophysiology
  - Retinal Vitreous Surgery
  - Strabismus
- Orthopedics
  - Hip
  - Pediatric
  - Surgical Arthritis
  - Traumas
- Plastic & Reconstructive
  - General
  - Hand
- Thoracic Surgery
- Urology

Stanford University Hospital*

Balance Sheets

Fiscal years ending August 31, 1981 and 1980	1981	1980
Assets		
Current assets		
Cash	$ 692,446	$ 1,793,003
Receivables		
Patient accounts, less allowance for doubtful accounts and contractual allowances of $5,654,587 in 1981 and $5,903,206 in 1980	34,148,757	30,632,383
Other	716,254	640,670
Inventories	3,092,502	2,214,073
Prepaid expenses	454,054	448,018
Total current assets	39,104,013	35,728,147
Property, plant, and equipment		
Land improvements and leasehold improvements	1,234,615	1,227,533
Buildings	25,980,297	23,769,657
Fixed equipment	7,644,466	7,199,082
Movable equipment	17,940,371	16,156,802
Construction in progress	1,451,300	1,514,289
	54,251,049	49,867,363
Less accumulated depreciation and amortization	22,877,748	20,139,302
	31,373,301	29,728,061
Short-term investments held for building renovation	11,699,778	6,690,299
Short-term investments held as self-insurance reserves	1,103,128	702,021
Restricted cash and short-term investments held in trust by Stanford University	1,928,655	1,665,501
Reserves and sinking funds required by debt agreements	1,620,060	1,515,073
	$86,828,935	$76,029,102
Liabilities and Fund Balances		
Current liabilities		
Accounts payable	$ 6,421,626	$ 5,761,740
Government health insurance programs	3,668,613	2,823,144
Current portion of long-term debt	463,945	439,873
Accrued payroll	10,121,009	7,440,290
Payable to Stanford University	1,548,546	1,642,272
Other accrued expenses	2,245,528	2,351,771
Total current liabilities	24,469,267	20,459,090
Deferred revenue	83,022	122,005
Long-term debt, less current portion	12,229,117	12,693,061
Total liabilities	36,781,406	33,274,156
Contingencies		
Fund balances		
Restricted	1,928,655	1,665,501
Unrestricted	48,118,874	41,089,445
	50,047,529	42,754,946
	$86,828,935	$76,029,102

*These financial statements were prepared from the Hospital's accounting records after examination by the Hospital's independent auditors. The preparation and accuracy of the statements are the responsibility of management and are intended to assist the reader in understanding the Hospital's operations.

The statements do not include the explanatory notes integral to their complete presentation and have not been reviewed by the independent auditors. Readers may obtain the auditor's report by requesting it in writing from the Director of Finance, Stanford University Hospital, Stanford, California 94305.

Stanford University Hospital

Statements of Revenues and Expenses

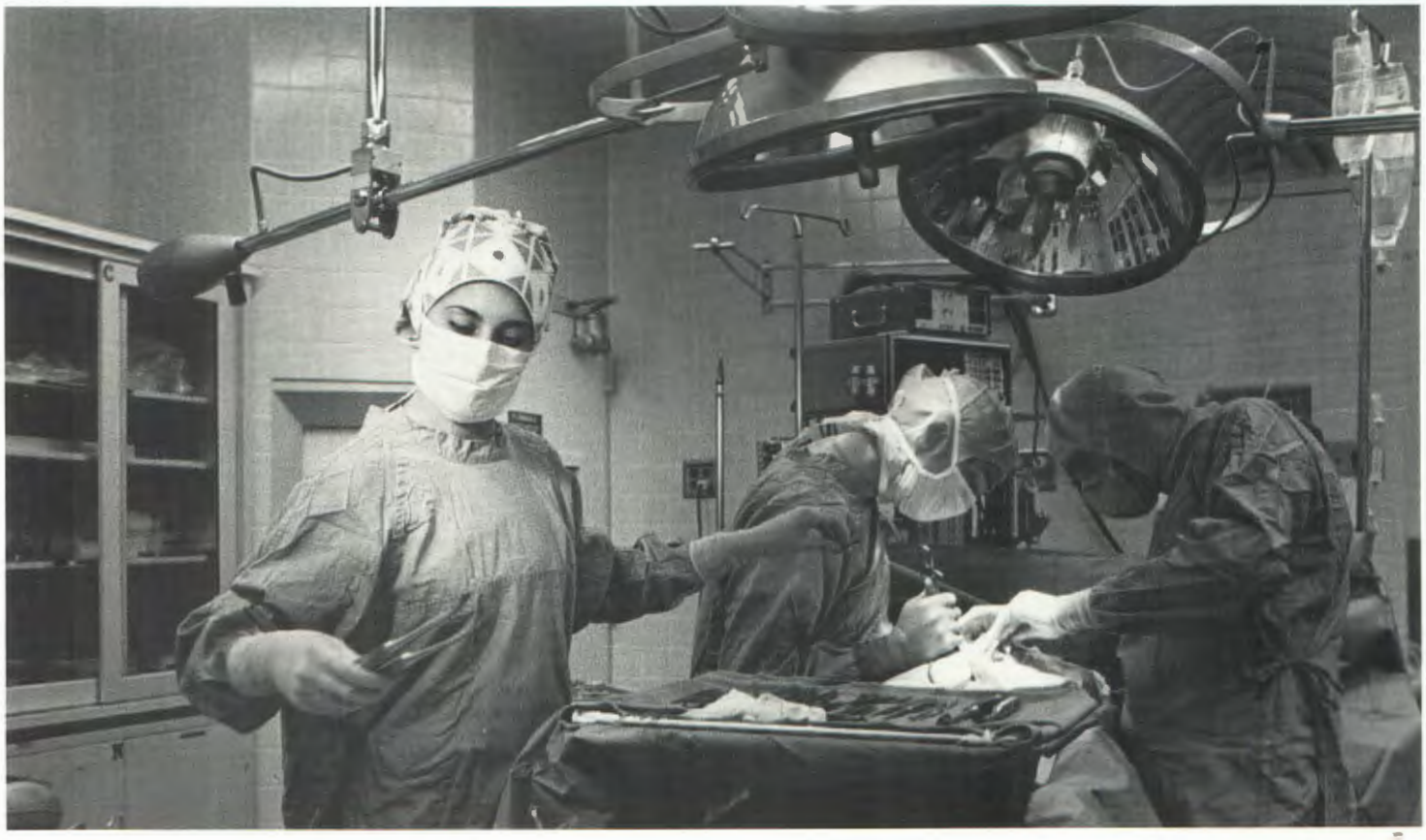
Fiscal years ending August 31, 1981 and 1980	1981	1980
Patient service revenue		
Daily hospital services	$ 61,284,260	$ 50,684,738
Ancillary services		
Inpatient	70,596,955	53,761,654
Outpatient	13,151,832	10,352,335
Emergency	2,557,654	2,132,903
	147,590,701	116,931,630
Deductions from revenue		
Contractual allowances	16,082,153	10,713,815
Other allowances and provision for uncollectible accounts (net of related grants of $5,251,007 in 1981 and $4,650,587 in 1980)	5,915,684	3,728,424
	21,997,837	14,442,239
Net patient service revenue	125,592,864	102,489,391
Other operating revenue	1,679,955	1,358,610
Total operating revenue	127,272,819	103,848,001
Operating expenses		
Daily hospital services	35,618,681	29,372,170
Ancillary services	48,178,656	39,567,334
General services	11,731,972	11,129,370
Fiscal services	8,810,714	6,007,603
Administrative services (including interest expense of $769,867 in 1981 and $765,043 in 1980)	14,343,811	10,749,222
Depreciation and amortization	2,855,876	2,491,267
Total operating expenses	121,539,710	99,316,966
Excess of revenue over expenses from operations	5,733,109	4,531,035
Nonoperating revenue (principally interest income)	1,231,687	1,419,510
Excess of revenue over expenses	$ 6,964,796*	$ 5,950,545*

*When combined with depreciation and other funds, this amount is used for servicing of debt, equipment purchases, working capital, reserves for future plant replacement, and other purposes as shown on the following page.

Stanford University Hospital

Statements of Changes in Financial Position

Fiscal years ending August 31, 1981 and 1980	1981	1980
Sources of working capital		
Operations		
Excess of revenue over expenses from operations	$ 5,733,109	$ 4,531,035
Add (deduct) items not requiring (providing) working capital in the current period		
Depreciation and amortization	2,855,876	2,491,267
Decrease in deferred revenue	(38,983)	(65,677)
Working capital provided by operations	8,550,002	6,956,625
Nonoperating revenue	1,231,687	1,419,510
Working capital provided by operations and nonoperating revenue	9,781,689	8,376,135
Long-term borrowings	-0-	316,278
Decrease in short-term investments held for building renovation	-0-	1,357,055
N.I.H. grants	5,251,007	4,650,587
Restricted gifts, interest, and other receipts (including $1,420,162 in 1980 from Stanford University)	539,353	1,662,470
	15,572,049	16,362,525
Uses of working capital		
Additions to reserve and sinking funds	104,987	116,150
Additions to plant and equipment, net	4,501,116	5,266,669
Decrease in long-term debt	463,944	439,873
Restricted fund expenditures	5,436,521	4,732,764
Payments to Stanford University for bond retirements, interest, and working capital advance	-0-	1,353,766
Increase in restricted funds held in trust by Stanford University	263,154	85,910
Increase in short-term investments held for building renovation	5,009,479	-0-
Increase in self-insurance reserves	401,107	624,631
Other, net	26,052	27,542
	16,206,360	12,647,305
Net increase (decrease) in working capital	$ (634,311)	$ 3,715,220



Stanford University Clinics

Financial Facts: Faculty Practice Program

Fiscal years ending August 31, 1981 and 1980	1980/81	1979/80
	(in thousands)	
Where Funds Came From		
Gross regular revenue		
Revenue from outpatient services	$ 9,436	$ 8,025
Revenue from inpatient services	20,814	16,956
Total regular gross revenue	30,250	24,981
Less allowances		
MediCal late billings, Medicare/MediCal nonbillable	225	358
Discounts	275	326
Contractual disallowances	4,474	3,306
Bad debt provision	1,814	755
Total allowances	6,788	4,745
Total regular income	23,462	20,236
Total miscellaneous other income	464	500
Total all income	23,926	20,736
How Funds Were Used		
Shared expense	4,300	4,027
Rent expense	503	426
Direct expense		
Faculty salaries	7,230	5,820
Other salaries	3,045	2,557
Staff benefits	1,972	1,608
Capital equipment	126	93
Materials and services	1,541	1,278
Interest expense	860	429
Faculty Practice Program contingency reserve funding	381	319
Total direct expense	15,155	12,104
Total expense	19,958	16,557
Total net gain (loss)	$ 3,968	$ 4,179
Reconciliation to books		
Interns/residents	$ -0-	$ (92)
Overhead tied to faculty salaries	-0-	-0-
Reconciled to books	3,968	4,087
Distribution to departmental research and development accounts	(2,570)	(2,093)
Distribution to Medical School discretionary fund	(1,098)	(1,676)
Distribution to Medical School capital fund	(300)	(418)
	-0-	-0-

Stanford University School of Medicine

Financial Facts: School of Medicine Operations

Fiscal years ending August 31, 1981 and 1980	1980/81	1979/80
	(in thousands)	
Where Funds Came From		
Federal support	$34,808	$31,927
Indirect cost recovery	9,939	8,960
Tuition and fees	4,207	3,107
Special funds	9,232	8,612
Gifts and grants	12,860	9,522
Endowment income	4,885	4,952
	$75,931	$67,080
Where Funds Were Spent		
Administration and general expense	$ 2,080	$ 1,804
Instruction	28,787	25,226
Sponsored research	33,285	29,807
Student services	587	526
Operations and maintenance	4,980	4,705
Library	970	829
Student aid	5,242	4,183
	$75,931	$67,080
	Excludes $162,672 plant improvements.	Excludes $916,667 plant improvements.

All facts as of January 1, 1982,
unless otherwise defined.

Photographs by:
George Fry III
Charles Painter
Ronald Jay Shuman (cover)
Mark Tuschman

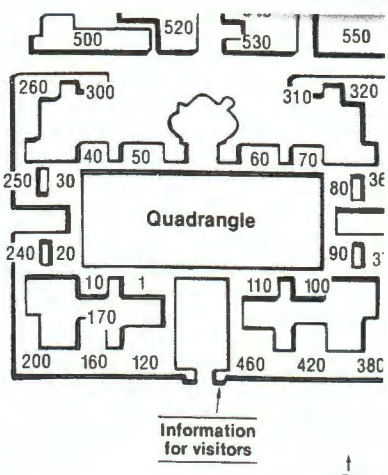
STANFORD UNIVERSITY

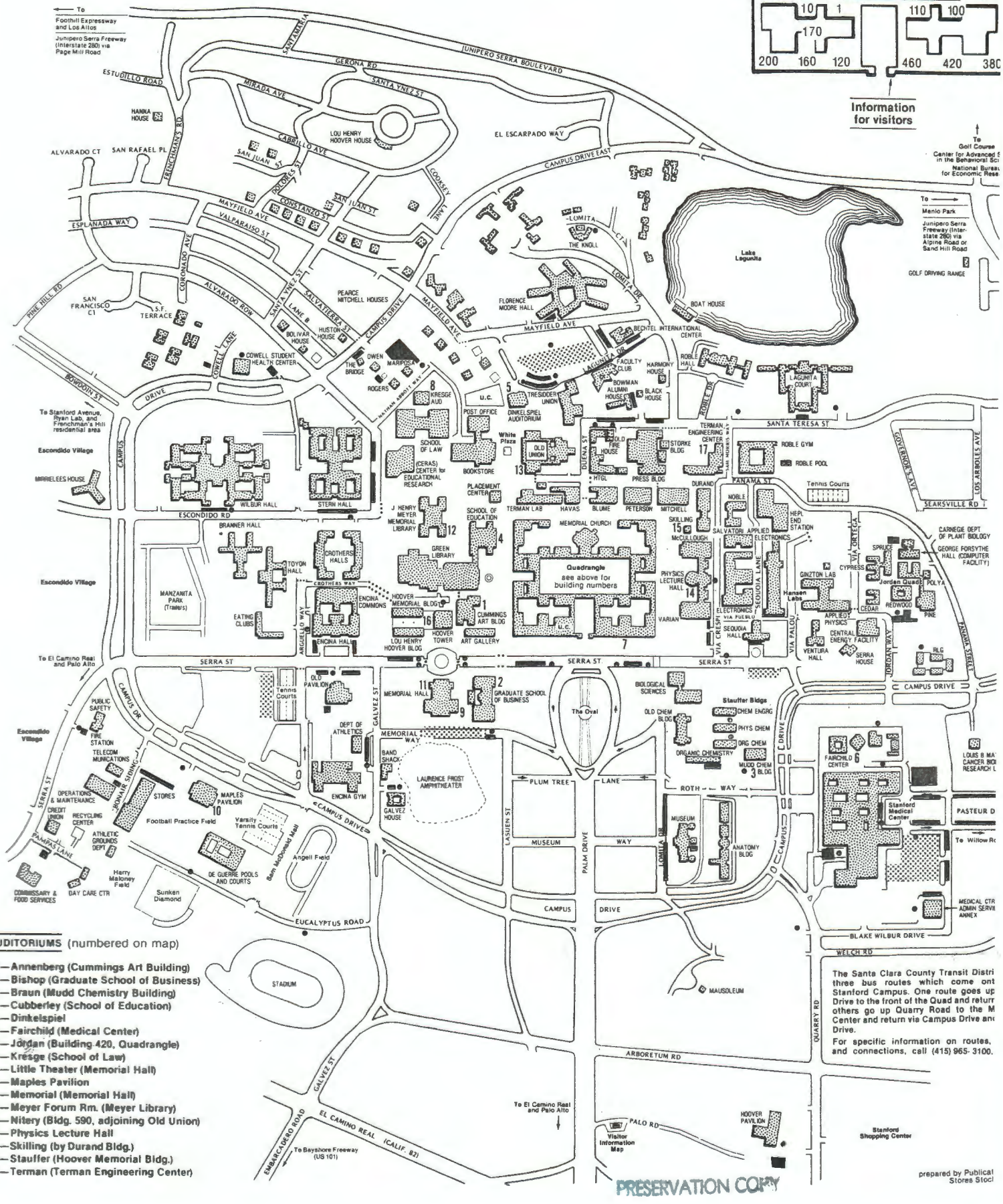
Time limit parking
Pay parking lot (quarters only) — 8—5, Monday through Friday

● Parking for the physically limited
Enforced 24 hours, 7 days per week.

u.c.—under construction

North





AUDITORIUMS (numbered on map)

1—Annenberg (Cummings Art Building)
2—Bishop (Graduate School of Business)
3—Braun (Mudd Chemistry Building)
4—Cubberley (School of Education)
5—Dinkelspiel
6—Fairchild (Medical Center)
7—Jordan (Building 420, Quadrangle)
8—Kresge (School of Law)
9—Little Theater (Memorial Hall)
10—Maples Pavilion
11—Memorial (Memorial Hall)
12—Meyer Forum Rm. (Meyer Library)
13—Nitery (Bldg. 590, adjoining Old Union)
14—Physics Lecture Hall
15—Skilling (by Durand Bldg.)
16—Stauffer (Hoover Memorial Bldg.)
17—Terman (Terman Engineering Center)

The Santa Clara County Transit Distri three bus routes which come ont Stanford Campus. One route goes up Drive to the front of the Quad and returr others go up Quarry Road to the M Center and return via Campus Drive an Drive.

For specific information on routes, and connections, call (415) 965-3100.

prepared by Publicat Stores Stocl