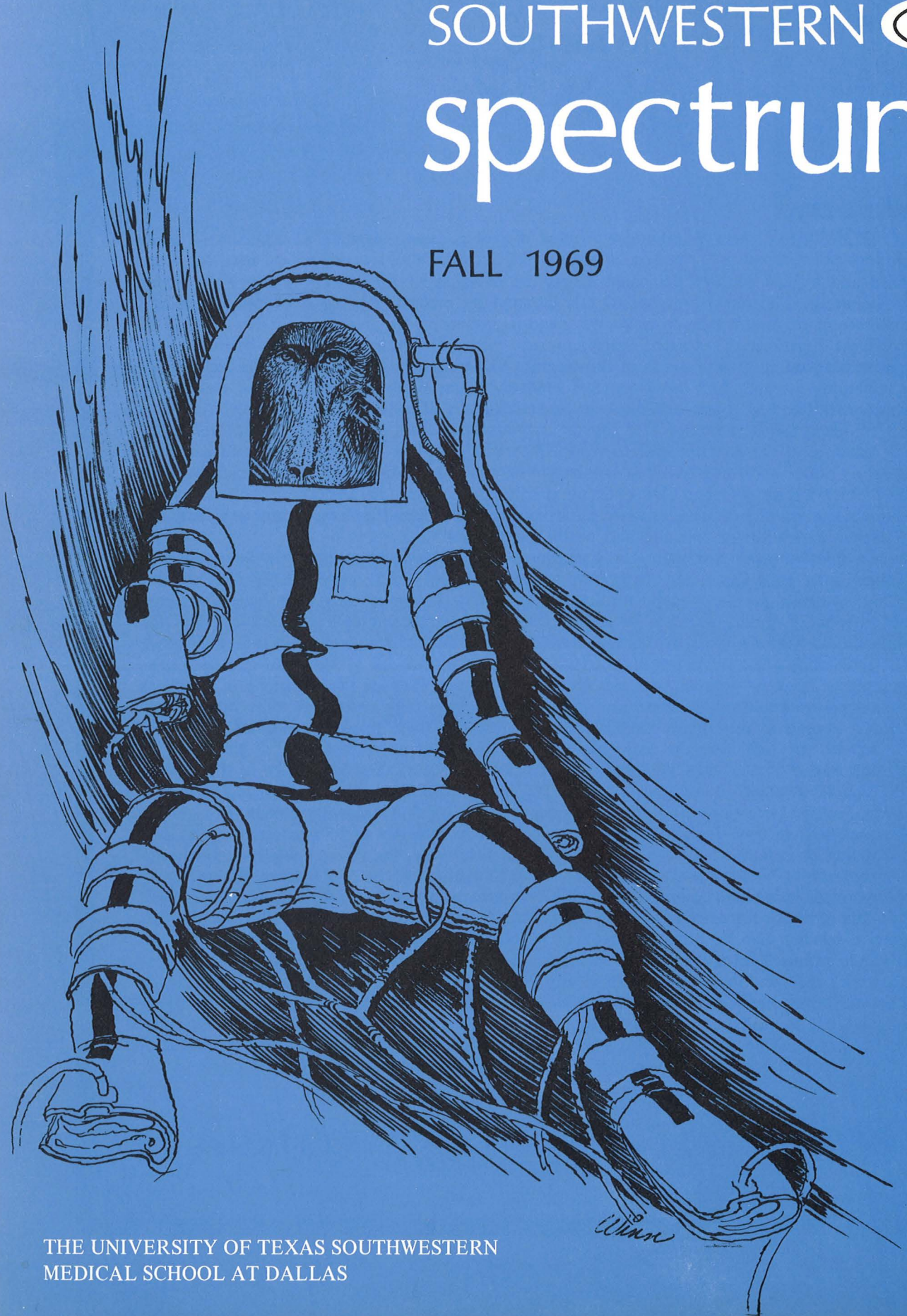
SOUTHWESTERN spectrum

FALL 1969



THE UNIVERSITY OF TEXAS SOUTHWESTERN
MEDICAL SCHOOL AT DALLAS

the relevance of research

Commentary By
Dr. Charles C. Sprague,
Dean of The University
Of Texas Southwestern
Medical School at Dallas

TWO WORDS that seem to dominate current discourse among medical educators are "manpower" and "relevance." The first, of course, refers to the obvious and critical need for more physicians and trained support personnel across the entire spectrum to meet society's escalating health care needs. The priority nature of this demand on medical schools is beyond question.

The second oft-heard term is frequently used in evaluating the relative priorities assigned to the three basic functions of research, health care and education. Perhaps inevitably, pressed as we are to meet burgeoning growth needs in the teaching and treatment areas, we hear the "relevance" of the remaining research function more and more called into question. Faced with converging pressures, something has got to "give" — and research is the likely victim.

An argument can be mounted that sounds comparable, at least superficially, to that frequently heard in criticism of the nation's space program: how can resources be poured into such desirable but eminently postponable endeavors as moon probes, one hears, while much more pressing down-to-earth problems such as urban slums remain unsolved? Applying the analogy to medical education, shouldn't much of the more esoteric basic research be deferred in favor of accomplishing the needed drastic expansion of teaching and health care capabilities?

A case can be made that there has been some overemphasis on research at the expense of the teaching role. In a sense, the disproportionate amount of funds available for research has skewed the academic profile of many medical schools. This imbalance largely is being corrected through cutback of funds available to laboratories and enlargement of teaching loads. But the pendulum should not now swing so far that we risk losing much valuable groundwork of the past.

The research process is not a spigot that can be turned on and off at will — it requires a continuous input of bright youngsters with a fresh spirit of inquiry. It needs the continuity of relentless attack on unsolved problems. If there are no avenues of financially supported study open to talented young people as they finish medical training, enabling them to pursue interests cultivated while in school, they will lose the momentum and initiative for potentially fruitful research.

Medical schools have been the traditional crucibles for advancing knowledge in the healing sciences. The relationship of research and teaching is both historic and pragmatic; it is a logical union of two integral functions, with both the areas of teaching and discovery benefiting.

Advancement of any discipline depends heavily on its teachers to further discovery as part of a continuing process of viable self-analysis. Almost invariably, the teacher who is actively engaged in research in his field and regularly reporting his findings is the *best* teacher. His own personal growth and enthusiasm cannot help but be conveyed to his students, to their benefit. Indeed, the rapid rate at which the existing store of knowledge becomes obsolescent virtually requires that the effective teacher also be a lifelong student of his specialized field; certainly in medicine he cannot content himself with dusting off and rereading a 20-year-old set of lecture notes.

I am not suggesting that we diminish in any way our efforts to meet the exploding demands for more and better medical services. But I would offer a word of caution that in our headlong rush to solve our immediate problems we do not sever the roots that nurture long-term advancement of the betterment of mankind. We should take care not to allow the productive apparatus of basic research, which has so long been a beneficial adjunct to medical teaching, to wither and die.

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SOUTHWESTERN spectrum

CONTENTS

ON THE COVER

The laboratory baboon that appears to be walking in space in our cover drawing by William Winn, assistant professor of medical art and visual education, is in reality helping a quest for life-saving take a forward leap. In UTSMS research led by Dr. Lawrence Cohen, associate professor of internal medicine and chief of clinical cardiology, a baboon is being used for initial tests of a device patterned after astronauts' pressurized suits — a promising means of helping heart patients survive critical periods following seizure. Story and picture, pages 14, 15.

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WHERE NOW, TR

ANSPLANTS?

Dr. Watts Webb, Chief of UTSMS Heart Team, Answers Questions About This Surgical Miracle

Dr. Webb, the pace of heart transplant operations seems to have slowed down quite sharply. Is this a fair appraisal? If so, why is this true?

Yes, the pace of heart transplant operations has slowed sharply. When heart transplants first started we thought the heart was less antigenic than the kidney and that tissue typing would not be as important. Our experience to date however has indicated that unless we can achieve a good tissue match the long-term results are not going to be good. Since it is very difficult to obtain donors at the moment an otherwise healthy person is dying of heart disease, transplants have been done with less-than-perfect tissue matching. Now, all transplant teams are demanding more perfect tissue matching, which of course reduces the number of compatible donors.

Would you explain the problem of tissue match in the body's rejection process? What is the magnitude of this problem?

The body rejects any tissue that is thought to be foreign whether it is bacteria, virus, or an organ from another person. If one has a perfect tissue match such as is found in indentical twins, then of course there is no rejection. Similarly, the closer the tissue match — as between closely related members of the same family — then the rejection is of less magnitude than between patients with very dissimilar tissues. This of course is the major problem at this time in achieving satisfactory long-term results in transplants that have to come from a cadaver.

What are the mathematical chances of a good tissue-match between any two individuals chosen at random?

There is only one chance in 100 that one individual's tissue will match that of any other unrelated person.

Was the close match between the late Dr. Philip Blaiberg and his heart donor the key factor in his long survival?

Dr. Blaiberg and his donor fortuitously were very closely matched from the standpoint of histocompatibility, or tissue match, and this largely explains his

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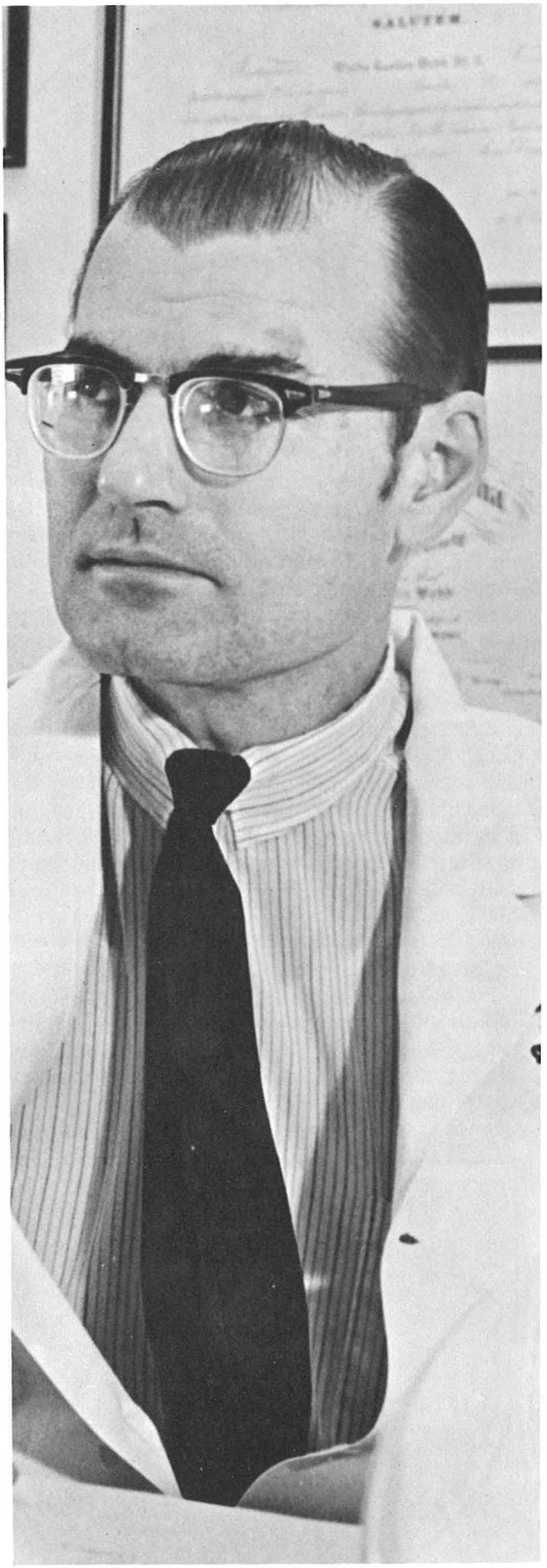
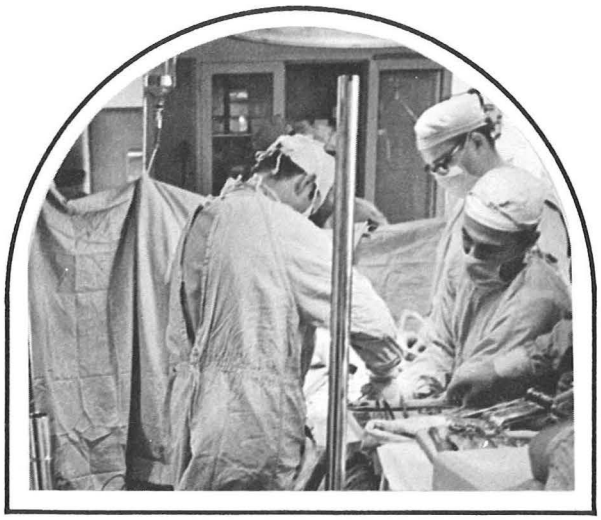


Watts R. Webb, M.D.



long survival. Since tissue matching was done only some time after the transplant this was just one of the extremely fortunate breaks, not only for Dr. Blaiberg but for the entire field of cardiac transplantation, since it demonstrated what can be achieved.

Do you foresee replacement of hearts and other vital organs, either by physically compatible living replacements or mechanical substitutes, becoming relatively commonplace?

Heart transplants will never be entirely commonplace. Of the half-million people who die each year of heart disease an estimated 80,000 are actually good candidates for heart substitution, either with a mechanical or human heart. Even if a good mechanical substitute or human replacements become easily accessible we do not have enough cardiac teams in this country to do more than a few hundred, or at best a few thousand each year. Similarly, we still have the problem of adequate potential donors.

For example, it is thought that perhaps some 25,000 to 30,000 peple each year might benefit from kidney transplants. Nonetheless, the total number done in the United States has plateaued at about 300 to 400 annually. This is in part due to the tremendous amount of work involved and the large team required for each of these. As the procedure becomes more simple and less expensive obviously more will be done, but again this is not the total answer. We must continue our efforts in another direction — primarily for the prevention of disease. It is in the realm of preventive medicine that the principal by-product of transplants — the spinoff of knowledge — can most usefully be applied.

Getting back to the present, could the pace of heart transplants accellerate appreciably even before rejection and other problems are solved, if a much wider choice of donors was available thus increasing the chances for a close tissue match?

The pace of heart transplants would accellerate if we had a wider choice of potential donors to achieve close tissue matches. By establishing heart banks and by tissue typing all potential recipients in advance, with the aid of a computer we could get a heart from London, San Francisco, New York or elsewhere. This has already been done to some extent in the greater Los Angeles area, the Boston area, and in fact several countries in Europe. Belgium, France, England, Germany, Holland and Italy have already linked together in a joint tissue-matching program so that they can exchange donor organs.

Just how critical is the shortage of potential heart donors? How can this shortage best be overcome?

If only those patients who die, e.g. of head injuries or in automobile accidents, and who are free of infection, cancer or other contraindications can be salvaged as potential organ donors in this country, this could amount to approximately 50,000 to 60,000 hearts per year. But this is idealistic because a great number of these occur at times and at places that prevent recovery of the organs before deterioration takes place. This has been overcome to some extent however by state legislatures making it legal for anyone to will his body or organs for transplantation purposes. This eliminates the necessity of contacting the nearest of kin and thereby waste crucial time.

Earlier you mentioned "heart banks." Do you envision these as the principal source of transplantable organs? How can hearts be preserved in a viable state?

Yes, I think in the not too distant future we will have organ banks similar to our present blood banks in which all transplantable organs will be stored. These will be shipped across country or around the world as needed. There are two areas of primary approach: one concerns a continuous pumping perfusing system that will supply oxygen and nutrients to the heart just as is done in the normal body. At this time it is possible to keep a heart or a kidney alive for a maximum of about three days with one of these pumping systems; and this is a very cumbersome, expensive procedure involving the constant attention of many technicians. The second area — the only practical one yet conceived for long-term storage — is that of freez-

ing the organs. Thus far, however, no one has been successful in freezing any organ for a prolonged period and have it return to satisfactory function. These are areas of great promise with await breakthroughs to real achievement.

Does resumption of the operations in Dallas await new breakthroughs on the problems of rejection?

While any new breakthrough on the problem of rejection would be indeed welcome, there is no doubt that with our present techniques patients who can be well-matched from the standpoint of red blood cells and histocompatibility antigens can be offered a reasonably favorable prognosis at this time.

Did this tissue-match question prove crucial in the two unsuccessful transplant operations conducted at Southwestern? What other controlling factors were involved?

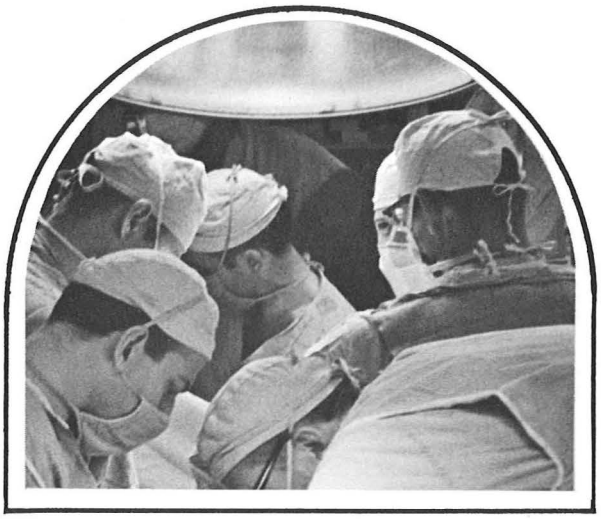
The histocompatibility problem was not the limiting factor in the operations here at Southwestern. Both of our patients already had organ-specific antibodies to their heart — antibodies which were acquired. Damage to their own heart had released some of the heart protein into the blood stream, and antibodies were developed to this protein which was circulating. In essence, they were allergic to their own heart and obviously would be allergic to any heart which might be transplanted. This acquired incompatibility is quite different from the genetically-determined tissue type present at birth.

What is the outlook at Southwestern for further transplants? Will they be performed more or less regularly at some time in the future?

Additional transplants will be performed — with great care to fully utilize all the knowledge that has been acquired in the past 18 months of clinical experience. Undoubtedly the tempo of transplantation at Southwestern and at other centers throughout the country will increase and transplants will become almost routine in the near future.

How do you foresee the tissue compatibility difficulties ultimately being resolved? What methods offer the most promise in this area?

The most promising lead at the moment is lymphatic depletion. The lymphocytes are small, round, white cells in the blood which act as messengers carrying the antigens from the transplanted organ to the lympathic tissues where antigens are developed and then back to the transplanted organ to attempt its destruction. If lymphocytes can be depleted either by antilymphocyte serum or by various drugs, this will reduce the severity of the rejection response. By removing lymph from the thoracic duct, which drains the lymph from the abdomen and chest, two and one-half to five gallons of lymph is drained daily. This can be centrifuged so as to remove the lymphocytes from the lymph much as one removes cream from the milk with a cream



separator, and the fluid is replaced intravenously. This depletion of the body's lymphocytes has had marked success in prolonging the survival of kidneys in patients that were treated with no other drugs.

In addition, various experimental techniques which have proved successful in rats and mice appear to suggest that we will soon be able to develop a state of true tolerance.

What is "true tolerance"?

It is a very complicated process that is quite difficult to explain in lay terms. True immunological tolerance means that the body is fooled into accepting a foreign organ as if it were the host's own tissue. When this can be achieved at the clinical level, with only a brief period of drug therapy and other manipulations, the patient will not be required to continue a lifetime of drug therapy — as is required at the moment — and will have normal resistance to bacterial infection.

Achieving a state of true tolerance, then, would eliminate major roadblocks to clinical success in transplantation, including the tissue-match problem?

Yes. When we achieve true tolerance we will be able to transplant not only human hearts but also

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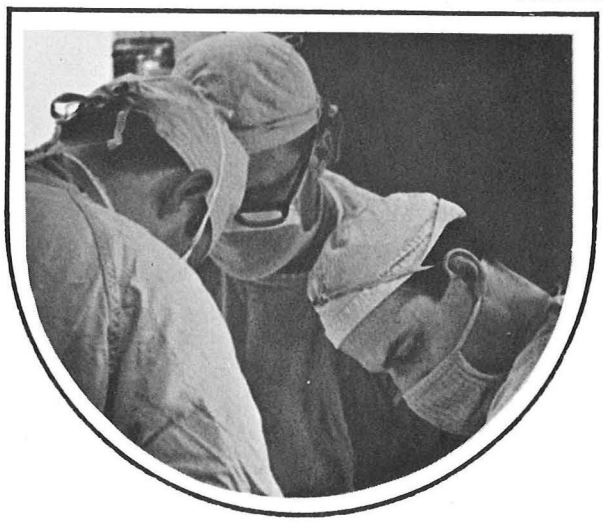


primate or other animal hearts without the depressant drugs that lower the body's resistance to infection.

How serious a problem has infection been up to now?

Infection has killed more transplant patients than anything else.

How soon will true tolerance become a reality?

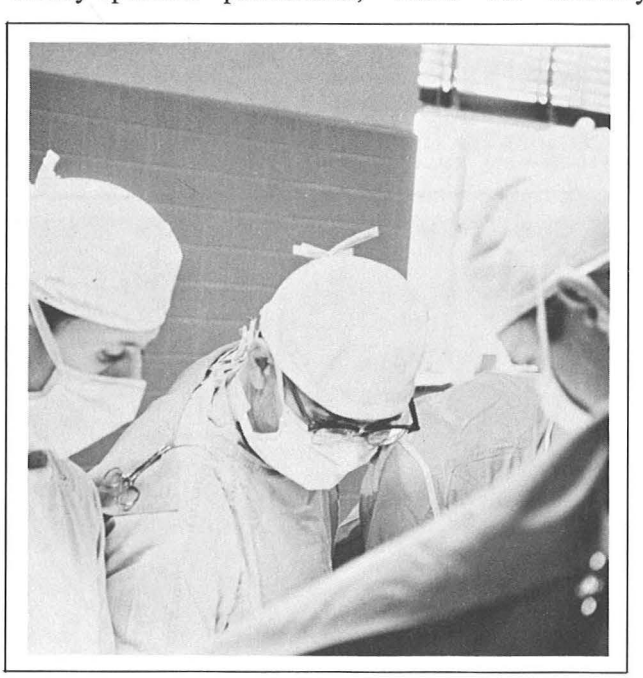
We are already achieving true tolerance experimentally in rats and mice and can expect to reach that point in a relatively few years with humans.

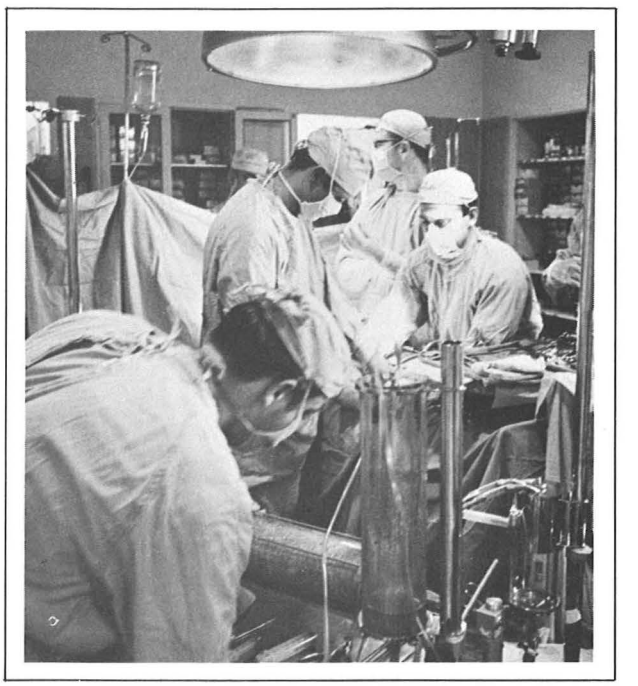
Recently, doctors in Houston implanted an artificial heart temporarily in a patient while awaiting a suitable donor. Research is under way at Southwestern and other institutions into various types of artificial or mechanical hearts. Is this the ultimate answer to replacement of diseased hearts, rather than transplantation of living substitutes?

Transplantation of living hearts and the development of artificial substitutes are complementary, not competing ventures. One of the greatest needs at the moment in the transplantation field is a mechanical support for a failing heart, whether one's own — as in a man with a heart attack — or after transplantation. This could serve such a patient for a week or two until his heart regained good function. Also, were an effective implantable artificial heart available this would provide a readily available means of taking from the shelf the proper substitute for implantation in many patients who need a new heart.

What problems are endemic to the artificial or mechanical approach that are not encountered in the transplantation of natural organs?

The major problem of course is that even our small battery-operated pacemakers, which are infinitely





simple compared to the complexity of the total heart replacement, require constant attention and frequent replacement of batteries. Until the artificial mechanical heart has achieved much greater dependability than has been achieved in our cars or refrigerators it is doubtful that they will be practical. All such machinery is subject to wear and breakdowns. Our natural organs however have the ability for self-repair even while continuing to function. The same is true with transplanted natural organs, which can be repaired by the body while continuing function.

As a means of encouraging wider public acceptability of the need to donate hearts for transplantation, would you suggest guidelines for potential donors — ways in which they can make their future availability known to the medical profession?

"Living Banks," which have a growing roster of potential donors who carry with them a card or wrist band for identification as a donor, have been established in Houston and New Orleans and are spreading to many other cities throughout the South including Dallas. In Boston the "Interhospital Organ Bank" promotes the procurement, preservation, and distribution of tissues and organs for transplantation.

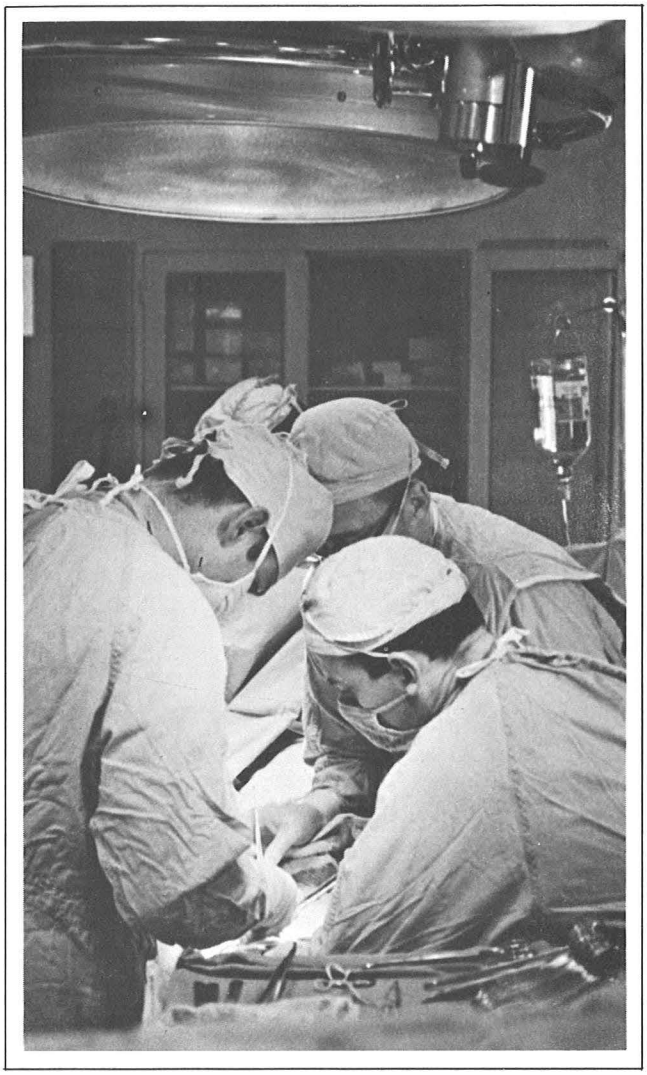
Transplantation of human kidneys has seemed markedly more successful than achievements so far in heart transplants. To what do you attribute this difference?

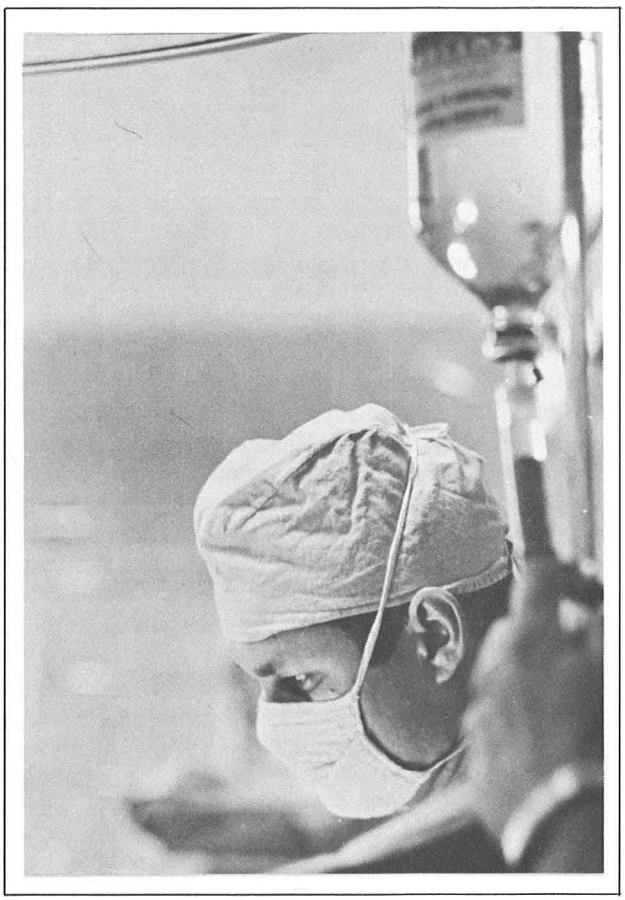
The transplantation of human kidneys seems more successful since the kidney only has to function around 10 per cent of normal capacity to maintain clinical health, while the heart must function at least 60-70 per cent even to maintain life. Many kidneys that have been almost completely rejected are still able to maintain life and health whereas a heart that is rejected, even minimally, may be fatal. Another im-

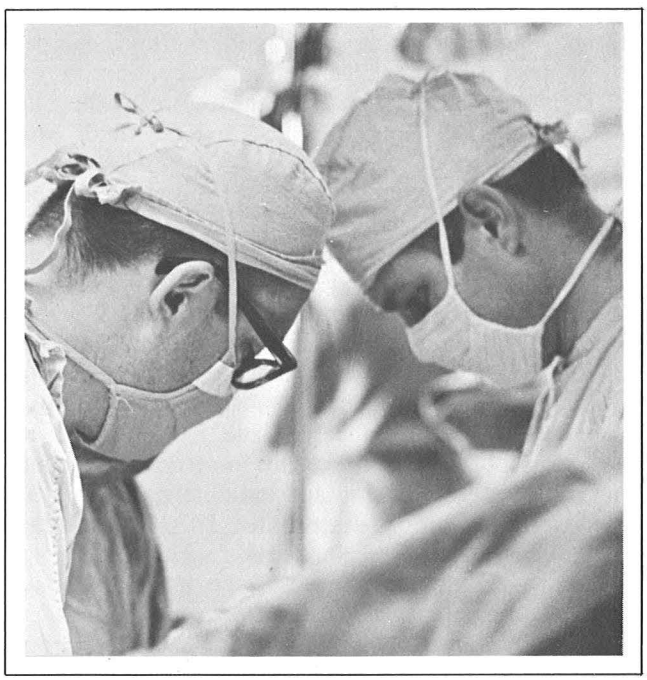
portant reason is that kidneys can be taken from living donors — from closely related members of the same family — and the tissue compatibility is excellent, whereas obviously hearts must come from a cadaver.

As chief of Southwestern's heart transplant team, you have probably had to field your share of criticism by those who apparently feel medical scientists have no business "playing God" in dealing so directly in life's vital processes. What is your philosophical approach to the question of transplantation and how do you reply to these critics?

The physician always has to play God in a sense by doing everything possible to prevent death and to aid healing. We do alter life's vital processes every day, and accept this as our direct role. Our prime purpose of course in the field of transplantation is to determine that everything being done is, insofar as we are able, the best possible approach for the welfare of the patient and that no harm is inflicted. Obviously, this means first being very certain that tissues that must be taken from a cadaver are from a person who is in truth completely dead. Secondly, that it is done under proper safeguards for everyone concerned including the patient, the patient's family, the physician, and the entire profession; and that again we are doing what is best for the patient in every possible sense. ■

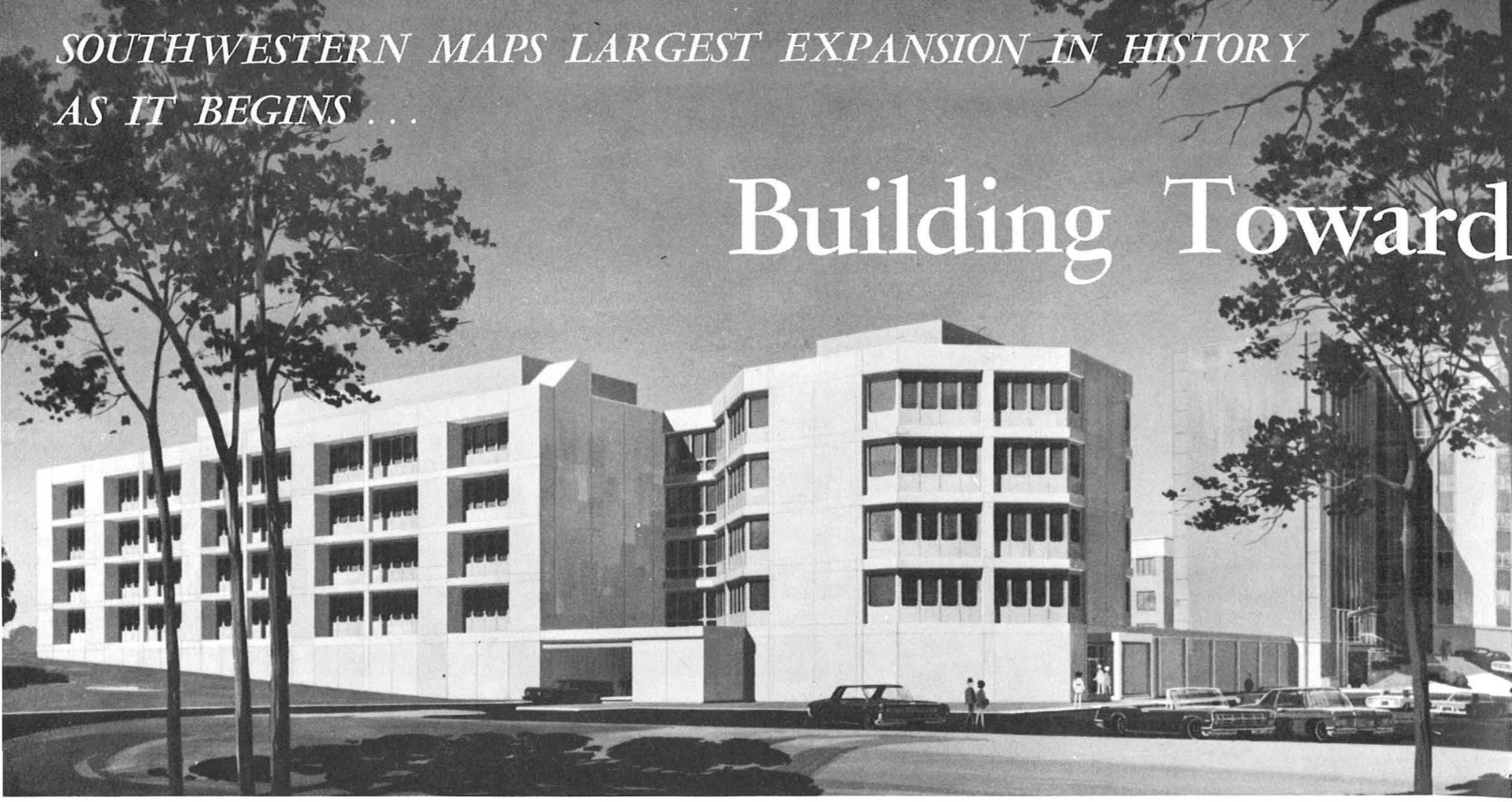






SOUTHWESTERN MAPS LARGEST EXPANSION IN HISTORY AS IT BEGINS . . .

Building Toward



New Basic Sciences Research Center

THE UNIVERSITY of Texas Southwestern Medical School is on the threshold of the most massive physical expansion in its history, with the first projects of a $40 million development program reaching construction stage and others being blueprinted to accommodate eventual doubling of the school's enrollment capacity.

The building program received a major thrust when trustees of Southwestern Medical Foundation voted recently to conduct a $7.5 million fund campaign to support the effort. A public solicitation in early 1971 is anticipated, with the campaign providing local matching money for state and federal funds which will be requested.

Dr. Charles C. Sprague, dean of the medical school, says the building program will enable the school to increase enrollment of medical students nearly 50 per cent — so that it will graduate 150 physicians each year as compared to the current 105. The program would lay the groundwork, he said, for acceptance of 200 medical students per class eventually and would significantly expand the school's programs of community service, education and research.

A total of 20 facilities and projects are included in Southwestern's Phase One building program scheduled for completion during the 1970s. A tentative timetable calls for sufficient new facilities to be completed to permit an increase in the freshman class to 150 by the fall of 1973, Dean Sprague said.

Contracts were awarded in June for the first two major projects — the Basic Sciences Research Building and a fourth-floor addition to the Cary Building.

A construction award for $7,041,800 for the Basic Sciences Research Building was awarded by the Boaord of Regents to T. C. Bateson Construction Co. and Bateson-Cheves Construction Co. of Dallas. A contract for $421,000 to build the additional floor to the Cary Building was awarded to Joe Funk Construction Engineers, Inc. of Dallas.

The Basic Sciences building will house research programs for departments of Anatomy, Physiology, Biochemistry and Pharmacology. The concrete structure of modern design will be built just west of present school buildings.

Other Phase One projects and estimated costs:

Florence Bioinformation Center $3.3 million; Medical Library Program $50,000; Computer Science Center $2.1 million; Medical Illustration Unit $700,000; Biomedical Instructional Communications Center $700,000; Bioinformation Science Unit $150,000; Basic Sciences Faculty and Research Unit $7.7 million; Multi-Purpose Teaching Laboratories $3.1 million; Anatomy Laboratories $600,000; Four Lecture Halls $1.7 million; Academic and Business Administration Facility $1.9 million; E. H. Cary Building Renovation for Clinical Sciences $1,826,000; Auditorium $1.3 million; Physical Plant Addition $580,000; Cafeteria $1.4 million; Student Housing Center $1 million, and Neuropsychiatric Institute $5,220,000.

The Florence Bioinformation Center is one of several structures on which detailed planning has already begun. The center will house the computer operations, library and audio-visual programs of the school.

Other buildings already in the detailed planning

Tomorrow

By BOB FENLEY, Director of Development

Most of the school's activities are concentrated in three buildings which are connected to its principal teaching hospital, Parkland Memorial Hospital.

The expansion will take place on a campus of approximately 54 acres which is the focus of a medical complex including Parkland, Children's Medical Center, St. Paul Hospital, Callier Speech and Hearing Institute, Texas Woman's University College of Nursing and the Dallas Health Department.

Actually, noted Dean Sprague, there will be a total of $60 million in medical facilities construction at the campus in the next few years. This includes a $20 million expansion program at Parkland Hospital.

"This building program, providing for certain facilities capable of accommodating up to 200 medical students per class in the future, will allow Southwestern Medical School to move realistically toward development of a truly outstanding institution for medical education and community service," Dr. Sprague said.

PHASE ONE BUILDING PROGRAM AT A GLANCE

Projects and their estimated costs are:

Basic Sciences Research Center	$7,041,800
Florence Bioinformation Center	3,300,000
Regional Medical Library Program	50,000
Computer Science Center	2,100,000
Medical Illustration Unit	700,000
Biomedical Instructional Communications Center	700,000
E. H. Cary Building addition	421,000
Basic Sciences Faculty and Research Unit	7,700,000
Multi-Purpose Teaching Laboratories	3,100,000
Anatomy Laboratories	600,000
Four Lecture Halls	1,700,000
Academic and Business Administration Facility	1,900,000
E. H. Cary Building Renovation for Clinical Sciences	1,826,000
Auditorium	1,300,000
Physical Plant Addition	580,000
Cafeteria	1,400,000
Student Housing Center	1,000,000
Neuropsychiatric Institute	5,220,000

stage and planned for construction within the next four years include the new administration building, teaching and classrooms building, cafeteria and faculty lounge and auditorium.

Two immediate projects scheduled for completion within the next year are the addition to the present Cary building, to provide temporary housing for the computer center pending completion of the Florence building, and the addition to the Physical Plant building, to provide administrative office space prior to completion of the new administration building.

A revised master plan has been drawn coordinating all new construction to a scenic and functional campus design. The plan features an elevated plaza extending east from the Student Union *(see sketch, pages 12, 13)*. Lecture halls are planned beneath the plaza, which will interconnect new and existing structures.

The immediate effect of the building program will be to relieve critical space shortages at Southwestern. Having long since grown beyond its physical facilities, the school rents commercial space for many departments.

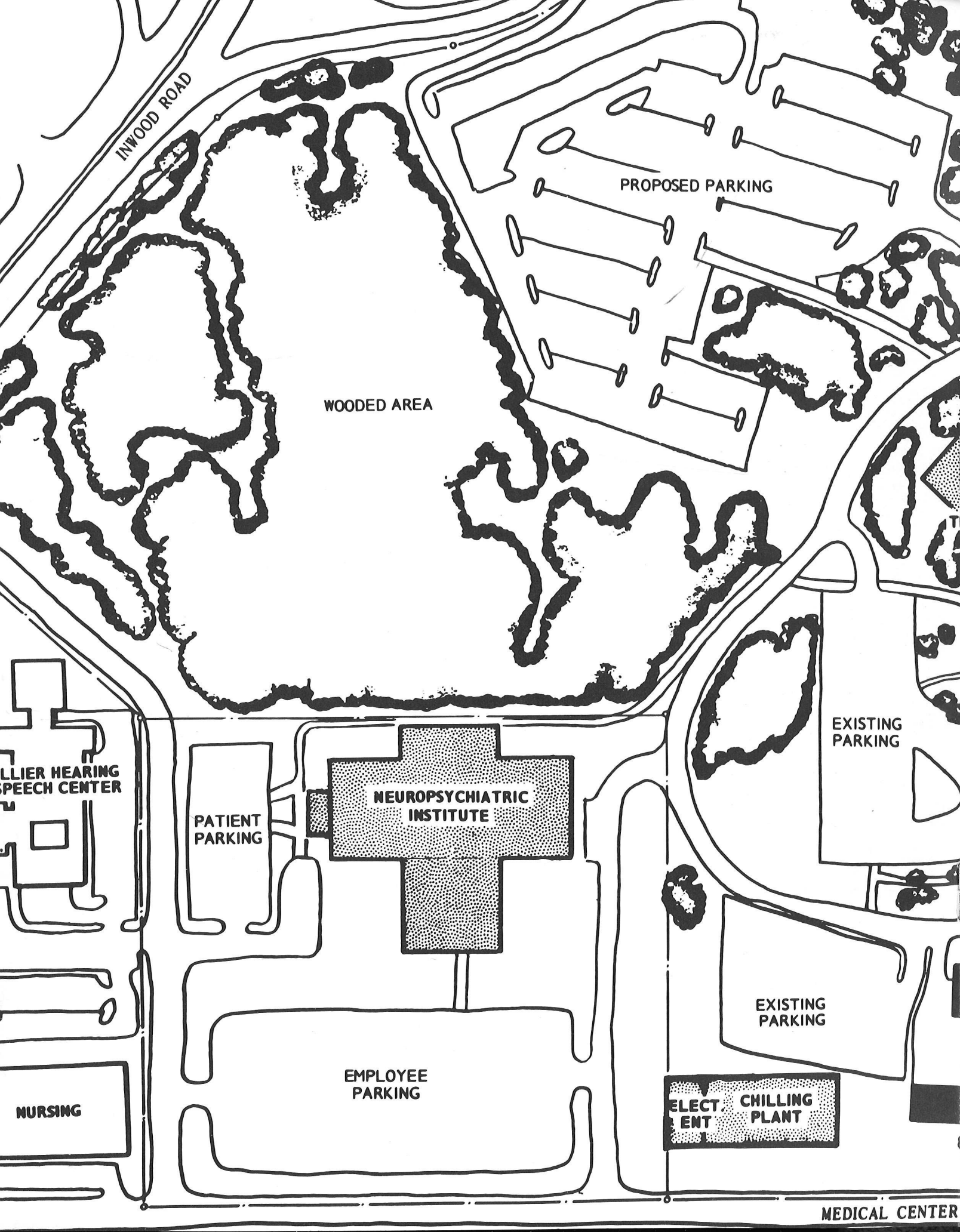
Dr. Sprague outlined these anticipated sources of funds to finance the medical school's expansion:

The University of Texas System funds, $11,659,300; federal funds awarded, $3,894,000; grant assistance, $12,126,700; Texas legislative appropriation, $3,220,000; and pledged funds, $1.6 million.

These sums, plus the $7.5 million pledged to be raised by the Southwestern Medical Foundation, will bring the total financing to the needed $40 million mark.

In undertaking the fund campaign, the foundation continues its major role in support of the medical school, a role that began 25 years ago when the organization founded the school. Southwestern became a component of The University of Texas System in 1949.

In addition to undertaking the development fund campaign, trustees of the foundation recently voted a $100,000 grant to the medical school for current operations. ■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LLIER HEARING
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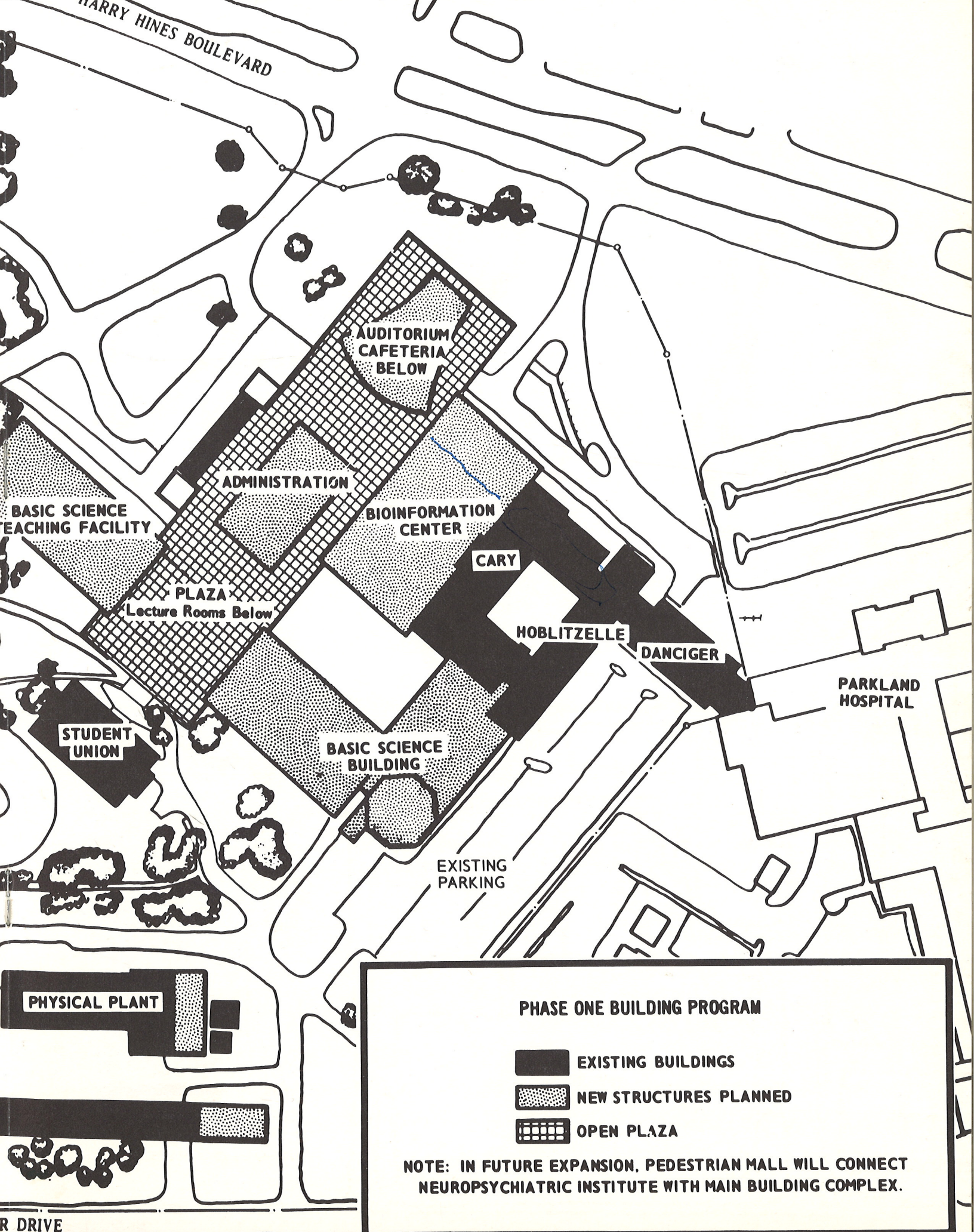
HARRY HINES BOULEVARD
AUDITORIUM
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BASIC SCIENCE
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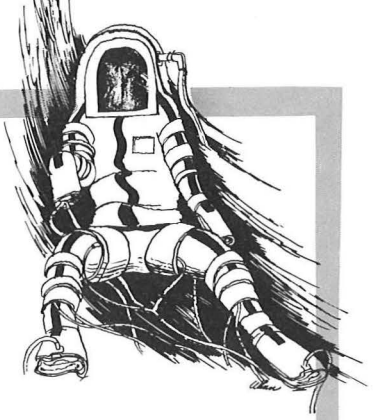
NOTE: IN FUTURE EXPANSION, PEDESTRIAN MALL WILL CONNECT
NEUROPSYCHIATRIC INSTITUTE WITH MAIN BUILDING COMPLEX.



Astronaut-Type 'Squeeze Suit' Tested With Baboon at UTSMS Shows Promise of Providing...

SPACE-AGE ASSIST FOR HEART VICTIMS

A MODIFIED ASTRONAUT'S suit may be utilized within the next few years as an emergency heart assist device to save the lives of individuals stricken with a severe heart attack.

The suit will squeeze blood from the arms and legs into the central portion of the body at the instant of heart relaxation, and relax itself at the onset of heart contraction. The net effect of this is to reduce the work load on the heart, and to augment coronary blood flow.

Dr. Lawrence Cohen, of the Department of Internal Medicine at the University of Texas Southwestern Medical School at Dallas, is collaborating with Dr. Charles Mullins and Dr. Jere Mitchell in the investigation. The research is being conducted in Southwestern's Pauline and Adolph Weinberger Laboratory for Cardiovascular Research.

"The unique feature of the Sequenced Pulsator is that the arms and legs of the suit are composed of a series of cuffs or bladders which can be precisely timed to inflate or deflate in sequence," said Dr. Cohen. (The cuffs will be similar to those used in blood pressure testing devices.) "The suit would 'milk' blood back into the central portion of the body from the extremities," he said.

"We anticipate that this device would be used in patients with acute myocardial infarction (death of areas of heart muscle). If you can diminish the work load of the heart after a myocardial infarction, marginal areas of heart muscle might survive."

If experiments already begun at Southwestern proceed on schedule, Dr. Cohen said, the suit might become a usable clinical tool in helping battle death from heart attacks within two years.

For the first experiments, baboons are being used since they most closely resemble the body build of humans, said Dr. Cohen. An experimental suit, tailored to the measurements of a baboon, is presently undergoing laboratory tests at the Dallas medical school.

"Our early tests indicate it is a promising device," Dr. Cohen reported, "although there is a considerable amount of work that still must be done on it before human tests can begin."

The human phase of the test program is tentatively scheduled to begin next year, he said, following completion of experiments with the baboon and thorough evaluation of the data from these tests. The artificial heart program of the National Heart Institute, which is financing and monitoring the research through the Hamilton Standard Corporation, will study the early findings before authorizing tests of the device to be made on humans.

A second, improved test suit made to human dimensions has been ordered, and should be delivered later this year. It will be "updated quite a bit," said Dr. Cohen, "to incorporate what we've learned during the animal tests."

One advantage of the Sequence Pulsator suit is that no tubes or other device need be surgically installed in the body.

It is hoped that the squeeze suit might circumvent another major problem of the pump devices which have to be placed into the body's circulatory system. After a while, the blood has a tendency to clot — apparently due to contact with the "foreign" materials used in the pumps and related equipment. The Sequenced Pulsator, on the other hand, has no direct contact with the blood.

There is a real need for such an emergency assist device. The mortality rate in people who go into shock from a heart attack is 80 per cent.

"A certain number of patients," said Dr. Cohen, "might be able to recover and their outlook be reasonable if such an early assistance device were able to get them through the initial period of shock."

Dr. Cohen explained that human experiments initially will utilize volunteers without any heart malfunction, for testing the workability of the suit. He envisions that clinical trials could begin some months later on patients who have actually suffered heart attacks. ■

Technician James Hedgman, left, and Dr. Lawrence Cohen prop up sleepy baboon for a portrait during laboratory tests of promising new heart-assist device.

Clinical Research - a quest for health

By JAY P. SANFORD, M.D.

● ***Basic research has made major and sometimes overlooked contributions to improve health and management of disease, contends Dr. Jay P. Sanford of Southwestern's internal medicine faculty. Far from being withdrawn, ivory-tower types, most medical scientists are also physicians and educators who are busy applying acquired knowledge in the treatment of patients and the teaching of students. Despite such obstacles as communications failures and public apathy or misunderstanding, he says, much is being accomplished in bringing the fruits of research to bear on the health needs of society. In an address reprinted below, Dr. Sanford makes a point-by-point reply to criticisms most often leveled at biomedical research. The speech was delivered recently in Atlantic City, N.J., before the American Federation for Clinical Research, of which Dr. Sanford is president.***

HAS CLINICAL RESEARCH failed in meeting the trust placed upon it by the American public? Have the American taxpayers, who have been footing this ever-increasing bill, been getting their money's worth or has Congress been giving away the taxpayer's dough to the eggheads? In this day of rapid and almost instant communication, of unequaled crowding, of enormous economic pressures, of minimal requirements for physical labor and hence maximum free time, of unbridled materialism and of constant, organized "protesting"—whether right or wrong—it is easy to become stampeded and to attempt to cure the symptoms before the cause has been elucidated. The temptation to succumb at times to expediency and faintheartedness is understandable. Today there is a growing sense that we in clinical investigation may have been building a Tower of Babel for personal aggrandisement or escape rather than pursuing our ultimate objectives, the conquest of disease, and the assurance of health for all of our citizens — that is, a state of complete physical, mental and social wellbeing, not merely the absence of disease or infirmity.

In 1948, Congress increased the budget of the National Institutes of Health from 8 to 28 million dollars, enabling the pattern of the NIH to be molded. Then in June of 1956, Congress essentially doubled the appropriations for the National Institutes of Health and thereby inaugurated the era of growth in medical research. By this action, Congress in effect established that it would be national policy to try to conquer disease and insure health through research, no matter how long or difficult the task. As tax-supported research funding approached the billion-dollar mark, the support of science inevitably became a major issue of public policy. In the last 20 years, 10 billion dollars of Federal money have been invested in the implementation of this policy.

In June of 1966, at the launching of Medicare, President Johnson expressed concern that insufficient attention was being given to the application of the results of laboratory health sciences research to the health problems of our nation. This concern has been articulated into at least four major charges. First, basic research has not contributed significantly to the establishment of health or to the management of disease. Second, the majority of biomedical investigators have withdrawn themselves from the arena of application or development of basic knowledge to the solution of health problems. Third, there exists a "significant body of fundamental information which is stagnantly awaiting application by competent practitioners." Fourth, clinical faculty members are devoting too much of their energies and time to research, at the expense of teaching and the delivery of health

care. As a corollary, there has been a changing emphasis in clinical investigation from patient-centered, disease-oriented research toward non-human, non-disease oriented research.

As clinical investigators, each of us must examine these allegations not from the standpoint of self-interest but from the vantage of what have been the accomplishments and what should be the goals and future approaches of biomedical research. From conclusions based upon analysis of these data, we must be prepared and willing to alleviate our deficiencies and to promote our strengths to the broad medical community, the American public and Congress.

Overemphasis on Life-Saving

First, has basic research contributed to the establishment of health or to the management of disease? My answer, unequivocally, is yes! Yet since 1955, a time which roughly correlates with major availability of funds for biomedical research, the general death rate in the United States stopped its long downward trend and has fluctuated over a narrow range, 9.2 to 9.4 per 1000 population, depending largely on the presence or absence of major influenza outbreaks. Certainly these data would not appear to support the value of our research effort. Unfortunately, as was well developed in the analysis by G. Williams, there has been an overemphasis on life-saving as the primary goal of biomedical research and care programs. This emphasis was most clear in the report of the President's Commission on Heart Disease, Cancer and Stroke.

The dividends from basic research can be better illustrated by individual examples. The area of infectious and communicable diseases provides some of the more striking examples. The polio and measles vaccine sagas are now so well accepted that we tend to forget them as recent advances. The current example, live attenuated rubella virus vaccine, well illustrates the value of basic research. The demonstration of viral interference, certainly a non-human, non-patient centered, non-disease oriented observation if viewed *in vacuo,* enabled P. D. Parkman and associates and T. W. Weller and F. A. Neva to devise a system and isolate rubella virus in 1962. The subsequent attenuation, development and testing of vaccines affords the promise of control of rubella with a degree of effectiveness comparable to that for measles. During the last major rubella epidemic in 1963-1964, there were an estimated 20,000 children born with birth defects including cataracts, glaucoma, cardiac defects, mental deficiency and deafness. The annual cost for providing care and education is approximately $9,000 to $13,000 per child. Dr. Louis Cooper, director of the rubella birth defect evaluation center at Bellevue Hospital Center, estimates that the dollar burden on the public, without consideration of suffering and potential loss of income, following the 1963-1964 epidemic will be 2.8 billion dollars.

Other examples of the value of basic research which might be mentioned would include the study of soil ecology, the isolation and taxonomy of streptomycetes, which led to the treatment of tuberculosis and other infections with streptomycin; or the development of electrophoretic analysis of plasma proteins, a basic research technique which provided one of the bases for definition of the immunoglobulins. These observations proceeded to the demonstration of secretory IgA, an understanding of which has now led to the real possibility of developing more effective means of immunizing against respiratory disease agents such as influenza which, as I have pointed out, do reflect in mortality statistics. As Dr. A. M. Weinberg of the Oak Ridge National Laboratories stated at the conference "Research in the Service of Man", "The bulk of biomedical science is in the prefeasibility stage and therefore the underlying basic research must be done broadly." If research is to conquer disease, it must stick to the central task of acquiring basic knowledge.

Obstacles Encountered

The second general allegation relates to the lack of application of the available scientific knowledge toward the provision of health. It must be recognized that the full application of basic knowledge encounters many obstacles. For example, the medical case against smoking as one potential factor in carcinoma of the lung or chronic airways disease, the latter now being second only to heart disease as a cause of adult disability, is very strong. The same failure of implementation would hold in the area of highway safety and seat belts. Yet broad segments of the public not only condone but have actively blocked attempts to implement these health measures. It equally well might be charged that clinical investigators all too frequently have been responsible for the premature extension of research procedures into clinical practice under circumstances whereby the public fails to grasp the investigative nature of the procedure. Although the recent implantation of a mechanical heart has excited the imagination of the public, its justification even as an investigative procedure is controversial. As Dr. I. L. Bennett Jr. testified before the Harris Subcommittee on Government Research, in 1967, "A paucity of basic knowledge is often the greatest impediment to a program of development."

There is much current debate about our investment

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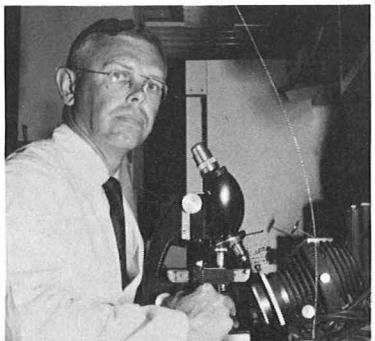
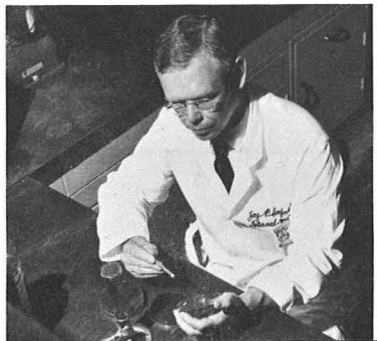
Dr. Jay Sanford at work in his laboratory





in basic research, versus applied or mission-oriented research, versus the provision of health services. If one only looks at dollars, the total cost of health care to the nation is 55 to 60 billion dollars. As R. Q. Marston noted in Military Medicine, "The portion devoted to medical research is only about 2.5 billion dollars, or 5 per cent, and the Federal share of this is about two thirds or 1.6 billion dollars. Thus, it is clear that even a billion dollars shifted to the health service bill, although ruinous to medical research and education, would contribute little to the service problems."

Cutbacks: False Economy

The upcoming cutbacks in research training grants and fellowships at the moment the nation faces an urgent and growing need not only for more physicians but also for more medical faculty members would seem to epitomize false economy. The report of the Gottschalk Committee illustrates that even the solution of a biomedical problem which ideally seems suited to solution through the application of available knowledge, chronic renal insufficiency, poses serious problems. Hemodialysis (removal of certain elements from blood by diffusion) which is life-saving carries the attendant hazard of infection, hemorrhage and thrombosis, not to mention the huge economic burden. The present economic burden is about $10,000 per patient per year, and it is estimated that as many as 5,000 patients each year reach the stage of being logical candidates for a dialysis program. Thus, the cost might approximate 50 million dollars per year. The need to define the cause of glomerulonephritis, to determine factors concerned with its progression and hopefully with such information, to prevent or modify the course of disease is apparent. The situation is analogous to the relationship between iron lungs and virus research in poliomyelitis as existed in 1950; both are important, but an either-or position is myopic.

Third, as to the question of a communications gap, if failures occur, it is largely because the best minds knowledgeable in the field fail to conceive or understand the possible relations of the new knowledge to utility. From an analysis of the abstracts submitted to the three clinical societies during 1953 to 1965, A. R. Feinstein and associates demonstrated a progressive decrease in the proportion of abstracts from human, patient-centered, disease-oriented categories toward those categorized as non-human, non-disease oriented. They concluded: "We have not attempted to judge the causes or values of the trends"; however, the implication pervades their presentation that this was contrary to the best interests of clinical investigation. Yet as one reviews the abstracts presented at the annual meetings of the American Federation for Clinical Research since 1944 and places them in the perspective of time, it seems apparent that many of the seemingly clinically irrelevant papers have formed important steps in the structure of our current clinical practice. Certainly the argument that each abstract has or will have clinical relevance cannot be supported; however, the proportion which does have clinical relevance is sufficient to strongly support the view that the meetings afford an excellent means to facilitate the incorporation of new knowledge into the solution of clinical problems.

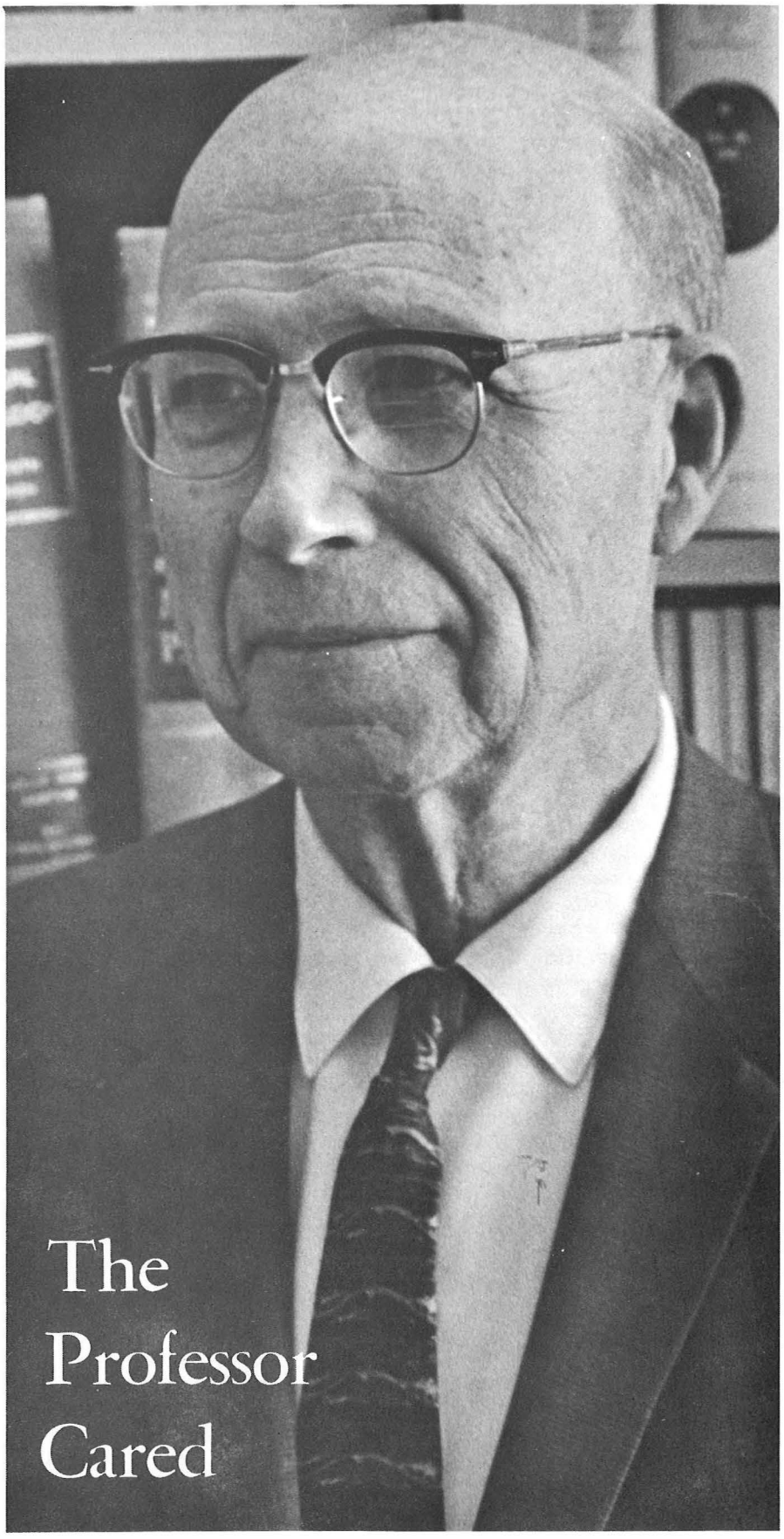
Fourth, briefly, the plea most recently voiced by Dr. W. B. Castle that "the faculty should strive to make all their teaching efforts more relevant to the prevention, understanding and treatment of disease" cannot be disputed. The question is one of defining that body of information which is relevant — Is messenger RNA or the role of cyclic AMP as a transmitter of hormonal messages relevant? J. Robert Oppenheimer put the matter well: "It is proper to the role of scientists that he not merely find new truth and communicate it to his fellows, but that he teach, that he try to bring the most honest and intelligible account of new knowledge to all who will try to learn. It is one reason why the patronage of science by and through universities is its most proper form, for it is here in teaching and association of scholars . . . that the narrowness of scientific life can best be moderated and the harmonies of scientific discovery can find their way into the wider life of men."

No Apologies Needed

Clinical research today has not achieved all that has been expected of it, in part as a consequence of unrealistic goals in the mind of the American public, in part because of social pressures and in part because the task is incredibly complex. As clinical investigators, we must not be mindless of these deficiencies, yet we do not have to hang our heads and apologize for our handling of the public trust toward reaching our goal — the provision of health and the conquest of disease. Finally, if we succeed in maintaining public and Congressional confidence in our goal, we must continually remind ourselves that the future is not merely an extension of the present. ■

"... If research is to conquer disease, it must stick to the central task of aquiring basic knowledge..."

The Professor Cared



A GENTLE, SCHOLARLY professor whose personal "alumni association" includes some 4,000 physicians, educators, dentists and pharmacists has retired from the faculty of the University of Texas Southwestern Medical School at Dallas, ending a distinguished career in science education that spanned nearly half a century.

Dr. Robert W. Lackey had been a professor of physiology at Southwestern since its doors opened in 1943, and taught virtually all the 2,000-plus graduates in the school's 25-year history. Before that, he instructed hundreds of students at Baylor University's medical, dental and pharmacy branches in Dallas.

During this time the genial Dr. Lackey has retained a fascinated regard for his extraordinary brood. Response of his students, associates and a distinguished parade of alumni reflects that the feeling was entirely mutual.

Some 120 of Dr. Lackey's colleagues, students and friends formally honored the retiring educator May 10 at a dinner at the Chapparal Club. Dr. Milton Davis, Dallas surgeon and former student of Dr. Lackey, served as toastmaster.

An engraved drum of a kymograph, a machine that records laboratory data, was presented to Dr. Lackey listing highlights of his career. He also received a volume of letters from former students.

Looking back over that remarkable career — the longest of anyone still active in medical education in North Texas — the 69-year-old Dr. Lackey found his work constantly challenging and only occasionally frustrating.

The constant association with so exceptional a group of young people has been his principal source of satisfaction, Dr. Lackey said.

"Teaching in a medical school, you spend a major portion of your waking hours with people who are far from a cross section of the community — you are dealing with an exceptional group. It is an inspiration to work with people who have a real purpose, who know what they want and are going for it."

If it weren't for his contacts out-

Continued

side the classroom, he observed wryly, he might never have known what average people are like.

The extent of his rapport with his students is repeatedly reflected in comment from his ex-students. Typical are the observations of Dr. Ann Hughes, who until recently was among some 40 of Dr. Lackey's exes now on the faculty at Southwestern.

"He lives and breathes teaching," she said. "He has always demanded a great deal—but you got a great deal from him. And always there was a twinkle in his eye — even when he was sort of chewing you out. He always gave you the impression he was interested in you as a whole person — not just as a student.

"He taught us a lot about the importance of being a human being. And he taught as much by example as by anything he said."

Dr. Lackey possesses two striking features that stand out in the minds of his associates, says Dr. John Vanatta, a longtime faculty colleague: his interest in students, and his sense of humor.

"He made a practice of knowing every student by name," said Dr. Vanatta.

Dr. Lackey has a farflung reputation as a joke-teller who liked to punctuate his incisive science lectures with shaggy-dog type stories. But he says his classroom jokes have mostly gone by the boards — casualties of a changing educational landscape.

The explosion of scientific knowledge has so crowded available lecture time that there is no longer "slack" to be taken up by an occasional story to "enliven things if students get drowsy." And the more sophisticated students of today no longer need the reassurance of an ice-breaking joke from the teacher, he says.

One stock stunt of Dr. Lackey's was a "gasser."

For years he has chosen a husky, deep-voiced male student for an invariably sure-fire gag. Concocting a ruse, he suggests the student count aloud to test his comprehension of elapsed time. Then he asks him to inhale helium gas and repeat the process.

The lighter-than-air gas temporarily alters the resonance of the vocal cords, turning the basso profundo into a shocked soprano — to the vast merriment of the rest of the class.

"It teaches them something about the properties of helium, too," he adds with typical twinkle.

The lot of the teacher has improved dramatically in the past four decades, Dr. Lackey observes — and so has the calibre of his students.

"Salaries of teachers have become much more equitable — even in relation to inflation — than they were even a few years ago."

Today, he said, experience and educational background are more fully recognized.

"The best students today are about as good as 15 years ago," he said, "But there are many more of the good, strong ones today. And they all have better basic background and with training have acquired an increasing capacity to perform."

One reason the median level of performance is higher is the heightened competition among applicants.

"Today there are 1,100 applications for 105 annual openings (at Southwestern). Ten years ago there were less than 500 applicants." Medical school adminstrators, while planning expansion in their schools' capacity, have no choice but to be increasingly choosy in selecting students — and therein lay one of the chief frustrations Dr. Lackey experienced.

In some 20 years on Southwestern's admissions committee, Dr. Lackey saw many potentially talented aspiring physicians fail to qualify academically.

"One of the greatest frustrations is to see so many that show a spark of promise turned away," he said.

A major improvement in medical education has been in giving medical students more free time away from laboratories and classes — attendance at lectures is not mandatory — so they may spend more hours reading in independent study.

Foremost among the problems a science teacher must cope with is the vast proliferation of knowledge and technical data, Dr. Lackey says. A reflection of this is the trend toward more guest lectures by experts in a specialized area within a scientific discipline.

"Forty years ago," the professor noted, "a teacher had a much heavier class load. One man had to do all the lectures in a course. And he didn't have time to do any research."

What about the current status of teaching vs. research?

"There are some instances when a person may so narrow his interest (in research) as to limit his interest and effectiveness in his overall teaching field," he said, "but generally speaking the discipline of continued research makes him a better teacher."

Dr. Lackey has had more than two dozen papers published in his own area of research interest, carbohydrate metabolism. He has explored in detail the factors influencing storage of carbohydrates in the heart muscle and differences in the ratios of their storage there and in the body's skeletal muscles.

The genial professor will spend "about a year" after retirement writing up additional research data — "a chore" deferred during earlier experimentation. He and Mrs. Lackey plan to do some traveling, and Dr. Lackey will pursue a favorite hobby, hunting. But only small game.

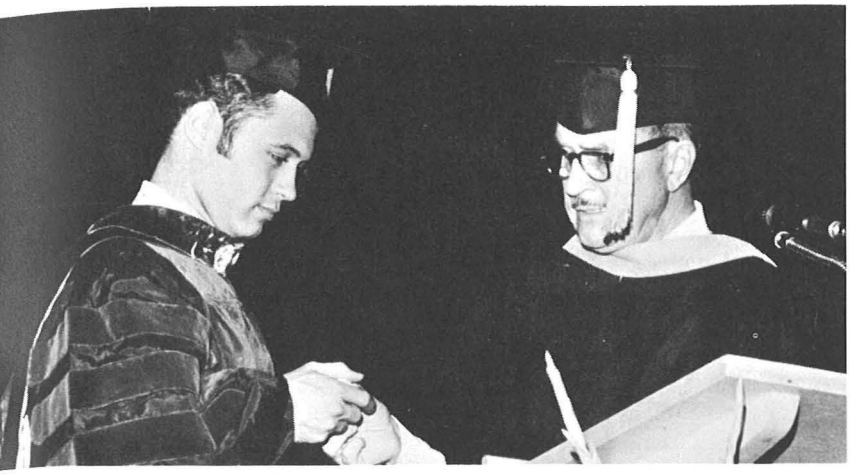
"I can't bring myself to shoot a deer," he said.

A native of Hico, Tex., Robert Lackey got off a train in Dallas in 1918. He graduated from Southern Methodist University in 1922. That same year, he became a research assistant at Baylor.

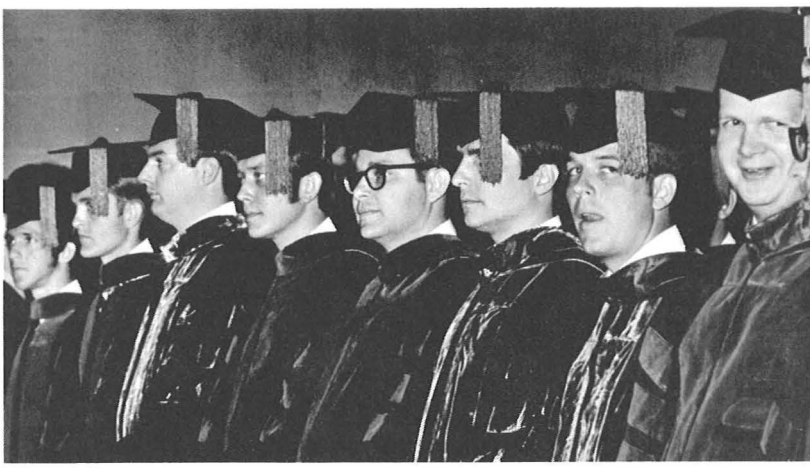
In 1925, Dr. Lackey was named an instructor in physiology. After time off to earn a master's degree from the University of Chicago in 1927, he advanced to assistant professor at Baylor, in 1928. An associate professorship followed in 1936, after he earned a doctorate from the University of Texas in 1934.

Dr. Lackey was chairman of the department of physiology at UT Southwestern from 1950 to 1965, and was assistant dean for student and curricular affairs, 1954-65. ■

GRADUATION '69

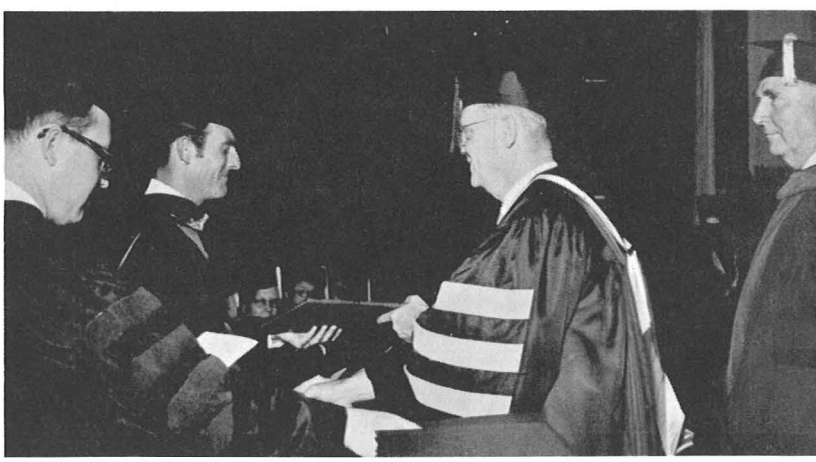


Dr. James Clark Huff, left, receives coveted Ho Din Award from George L. MacGregor, president of Southwestern Medical Foundation.



Brand new doctors await their diplomas in ceremonies at McFarlin Auditorium

Eugene McDermott addresses commencement crowd after receiving Santa Rita Award, UT System Development Board's highest honor



Asst. Dean Reuben Adams, left, and Dean Charles C. Sprague, right, watch proud moment as Robert N. Land receives MD degree from Regent Dan C. Williams

Dr. Johnston Heads UTSMS Exes

Dr. Dewey W. Johnston of Fort Worth, a 1949 graduate of The University of Texas Southwestern Medical School, took office Sept. 1 as new president of the UTSMS Alumni Association.

Dr. Johnston

Vice president and president-elect for the 1970-71 academic year is Dr. Elgin Ware of Dallas, member of the Southwestern Class of '46. New secretary-treasurer for the association is Dr. Gary C. Hutchison ('59), also of Dallas.

Dr. Johnston, an internal medicine practitioner associated with the Lorimer Clinic in Fort Worth since 1955, has set two major goals for the alumni organization:

- More involvement of alumni in student activities, with particular emphasis on private practice; and
- Improvement of post-graduate education, through more involvement of alumni and newer methods of communication between alumni and the medical schools.

Immediate past president Dr. Doyle Ferguson of Dallas, member of the UTSMS Class of '44, is new chairman of the alumni Board of Trustees. Other board members for the 1969-70 academic year are Dr. George E. Hurt Jr. ('57), Dallas; Dr. Joseph B. Cobb ('47), Dallas; Dr. Charles B. Mullins ('58), Dallas; Dr. Jerry L. Sims ('57), McKinney; Dr. Stanley J. Zimmerman ('55), Houston, and William Osburn ('49), Dallas.

The new alumni president, Dr. Johnston, was a clinical instructor of internal medicine at Southwestern from 1952 to 1956. He was chief of staff at Fort Worth's St. Joseph Hospital, 1965-66, and has been on the hospital's board of trustees since 1967.

Dr. Johnston is a fellow in the American College of Physicians and a Diplomate, American Board of Internal Medicine. He was president of the Texas Society of Internal Medicine in 1963, and is currently serving as president of the Texas Diabetes Society.

Dr. Johnston is a member of the Tarrant County Medical Society and is an active member of the Texas Medical Association, serving on several TMA committees.

Dazzler Marks School's 25th Anniversary

UT Southwestern Medical School's first 25 years sprang vividly to life in a sparkling multi-media show that highlighted celebration of the silver anniversary of the school's first graduating class, at the annual alumni reunion dinner March 17 at the Marriott Hotel.

The production, titled "Spectrum, '69," artfully combined multi-screen images of slides, film strips and cartoons with live action, narration and music to project a kaleidoscopic picture of the growth and development of the school.

The swift evolution of Southwestern, from its rickety beginnings in wartime shacks to its prestigious present with expansive plans for the future, was portrayed in the presentation, which was written and staged by Eleanor Chappell, actress-writer and wife of Frank Chappell, UTSMS director of medical information.

Mr. and Mrs. Chappell narrated the show, which was produced by Ethel Glenn, head of drama at Dallas' Bishop College. Special audio-visual effects were created by artists and technicians in the Southwestern department of Medical Art under supervision of William Osburn, chairman.

Some 350 persons attended the festive event in the Marriott's Conquistador Room. Members of the class of '44 were honor guests along with senior faculty members and administrators. Dr. Doyle Ferguson, alumni association president, served as master of ceremonies.

DR. RONALD E. COSTIN ('58)—Recently promoted to lieutenant colonel, in U.S. Air Force Medical Corps, is serving as medical adviser to the Royal Thai Air Force, Bangkok, Thailand. Since leaving Southwestern, Dr. Costin has earned a Master of Public Health degree from Harvard University and has attained the status of diplomate of the American Board of Preventive Medicine in Aerospace Medicine.

DR. JOSEPH MALLIE WHITE ('47)—Appointed vice president for academic affairs and dean of medicine at The University of Texas Medical Branch at Galveston. In this post Dr. White has responsibility for all teaching programs at the Medical Branch.

DR. ROBERT E. MILLER ('55)—Chief of general surgery at Fitzsimons General Hospital, Denver, has been appointed to volunteer part-time faculty of the University of Colorado School of Medicine.

DR. ROBERT E. MATEJKA ('55)—Aerospace medical officer serving at Cam Ranh Bay Air Base, Vietnam. Lt. Col. Matejka also holds a master of public health degree from Johns Hopkins University.

DR. SAMUEL A. SHELBURNE JR. ('60)—Research neurologist with the Division of Neuropsychiatry at Walter Reed Army Institute of Research, Walter Reed Army Medical center, has been promoted to major.

DR. WILLIAM M. HENSLEY ('67)—Has graduated from U.S. Air Force School of Aerospace Medicine's primary course at Brooks Air Force Base, Texas.

DR. WILLIAM H. KING ('59)—Decorated for meritorious service as director of aerospace medicine for the 392nd Aerospace Medical Group at Vendenberg AFB, Calif.

DR. DOYCE B. DEES JR. ('54)—Selected for promotion to colonel in the U.S. Air Force. A member of the U.S. Air Forces in Europe, he is commander of the 10th Tactical Hospital in Alconbury, England.

DR. CHARLES D. FOX JR. ('68)—Shared honors with Dr. W. Brooks Emory as "interns of the first trimester" at Methodist Hospital of Dallas.

the doctor's dilemma

Commentary By
Frank Chappell,
UTSMS Director of
Medical Information

THE DOCTOR is a born loser.

If the doctor himself lives long enough, he will lose every patient. Sooner or later we will die.

This is the way our world is ordered. We are born, we live for a time, we die.

It is common custom to measure the success or failure of the physician in treating a patient in terms of whether the patient lives or dies.

Medicine can hope to permit most of us to be born healthy, to live to a ripe old age, and to spend those years between birth and death as free as possible from the physical and emotional ills that plague all of us now and then.

Medical science can, and does, prolong life and add zest to that life. It cannot prevent death.

A great Cleveland heart specialist, Dr. Irving Page, wrote recently that "Death plays many roles. It brings welcome relief to sufferers; it snuffs out the lives of the young who have not yet lived; it is a pawn for the lives of others; it is a source of power in politics; it is the supreme sacrifice a man can make. And, now, it has been made by medicine something to be avoided at all costs by artificial means. Death is the only certain cutoff point in life, and that is why so much hinges on it. Death is man's goad, preventing his comfortable retreat into the nothingness of indifference. Without it we would need no ethics, only rules and regulations."

The past generation has witnessed many important new advances in science that have provided the physician with effective tools to prevent or cure many human ills that once defied treatment. In the generation ahead other ills will be overcome. Those that now head the list of the ten most common causes of death may become as rare as smallpox or polio.

But, as someone wrote recently, there always will be a list of the leading causes of death.

If we hold that prevention of death is the ultimate goal of medicine, medicine always will fail. Not very long ago it was enough to declare that death occurs when breathing stops and the heart ceases to beat. No longer is this enough. In the era of modern assistive devices that maintain heart beat and respiration, there is a new definition of death. Many people, laymen as well as physicians, now accept the premise that when the brain is dead the individual ceases to exist as a person.

There are unmet health needs in America. In seeking public support to step up the effort to meet those needs, it has become fashionable to stress the negative side of America's health care. For years the public has been bombarded with the inadequacies and failings of this nation's efforts to maintain health.

This constant bombardment has obscured the truly great accomplishments of medicine. It has resulted in a new generation of Americans who have grown up nurtured on the negative, only vaguely aware that the positive exists.

Heart disease, cancer and stroke are the great killers today. This we are told almost daily by our leaders in their efforts to spur even greater efforts to meet these problems. But tomorrow, when heart disease, cancer and stroke have been more or less solved, there will be others at the head of the list.

Certainly there must be no lessening of our nation's truly great effort to overcome the yet unmet health problems. But along with this effort it is well to remind ourselves now and then of how far we have come. And to remind ourselves that there always will be a limit.

We are born, we live for a time, we die.

Frank Chappell

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Address Correction Requested