FUNDS SUPPORT EXPANSION PROGRAM

$7,759,972 has been awarded to MDAH by federal and private sources to support a 222,000 square feet building program for the hospital and tumor institute, Dr. R. Lee Clark, Director and Surgeon-in-Chief, has announced.

When it was completed 10 years ago, Anderson Hospital was a unique institution. It combined the three functions of education, research, and patient care under one roof. The basic units of the design included a clinic, 300 hospital beds, general medical service laboratories, radiation therapy and nuclear medicine institute, library and educational areas, and basic research laboratories, all totaling 350,000 square feet. Several awards were won on the design of the building and the interior decor.

However, an urgent need for additional space has arisen within the past few years. Unforeseen progress has been made in cancer research. New areas of research and even new sciences vital to study of the cancer problem have come into being. Better techniques for treating cancer patients with radiation and drug therapy have been developed.

Participating in, and contributing to, the development of these and other new concepts, MDAH has come to have one of the leading programs in cancer research today. To continue this lead means more and new research, and new research demands room; and so, less than 10 years after it was first occupied, the hospital and tumor institute has outgrown its present structure.

In light of these developments, a special committee of architects and MDAH staff members in 1962 reviewed the growth needs of the hospital and submitted a building proposal through The University of Texas Chancellor to the Board of Regents, who approved the plans that year.

EXPANSION, continued on Page 2

MDAH and The University of Texas Graduate School of Biomedical Sciences at Houston

The University of Texas Graduate School of Biomedical Sciences at Houston, established in 1963 by an act of the 58th Texas Legislature, is already a functioning center of graduate education with its first students enrolled and studying under the program and more students being considered for enrollment in the fall.

For MDAH, the new school will provide true academic affiliation for the research staff; enhance the opportunity for intensification of graduate and research programs in the biomedical sciences; and stimulate increased collaboration in research among the basic sciences and medical sciences.

The Graduate School offers master's, doctoral, and postdoctoral programs in the academic areas pertinent to biological and medical research. The degree programs are to be developed and implemented in the Graduate School. Degrees will be awarded by The University of Texas.

The purposes of the courses of study are to provide the student with a broad base of competence in many related fields of science; to provide the student with special competence in a more restricted area of science; to stimulate intellectual curiosity; to provide the student with the basic intellectual tools of modern research; and to inculcate him with a continuing desire to learn, to analyze, to think independently, and to produce new ideas.

The School will comprise certain of the educational programs of MDAH, The University of Texas Dental Branch's basic science programs, and the former University of Texas Postgraduate School of Medicine's postgraduate medical education programs.

Acting Dean for the School is Dr. Grant Taylor, chief of the MDAH pediatrics section and former dean of the Postgraduate School. A Council of Advisors to the Dean is composed of (Graduate School, continued on Page 2)

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Dr. R. Lee Clark, MDAH Director and Surgeon-in-Chief; Dr. John V. Olson, dean of the Dental Branch; and Dr. Barnett M. Levy, director of the Institute of Dental Science at the Dental Branch.

The new School is divided into two parts, the Division of Continuing Education and the Division of Graduate Studies.

Although the Division of Continuing Education already had a smoothly operating system, much organizational planning was necessary for the Division of Graduate Studies.

Since 1947, MDAH had offered pre- and postdoctoral training in the basic sciences and clinical specialties; however, only laboratory training was given at the Anderson facility and class work had to be taken at the Main University in Austin. The new Graduate School called for courses to be conducted in Houston also.

To organize this division, the following three committees were appointed by Dr. Taylor: the faculty appointments committee, chaired by Dr. Sumter S. Armim of the Dental Branch; the curriculum committee, chaired by Dr. Felix L. Haas of MDAH; and the admissions committee, chaired by Dr. Robert B. Hurlbert of MDAH. The former two committees have now completed their duties.

The Committee on Graduate Studies, the division's major administrative committee, was established by the University of Texas Board of Regents to operate under the authority of the official document, The University Rules and Regulations, which governs the activities of all university branches. Dr. Haas, MDAH biologist and Graduate Advisor representing the University's Graduate System, is chairman of this committee.

Committees now functioning under the Committee on Graduate Studies include: the graduate faculty membership committee, under chairman A. Clark Griffin of MDAH; and the admissions committee under Dr. Hurlbert. Dr. Griffin and Dr. Robert J. Shalek, also of MDAH, are representatives from this Graduate School to the Graduate Assembly of The University of Texas.

General areas of study already approved by the Texas Commission on Higher Education for the Division of Graduate Studies include biology, biochemistry, pharmacology and therapeutics, and clinical physiology, and experimental medicine.

Although the architects' final drawings were transferred to the Division of Continuing Education, the Committee on Graduate Studies requested and received from federal and philanthropic agencies funds allocated by federal agencies included $1,400,000 from the Hill Burton Fund; $1,898,748 from the Health Research Facilities; and $732,252 from the National Cancer Institute.

Private and philanthropic organizations which pledged funds include the estate of the late Mose Gimbel, $850,000; the M. D. Anderson Foundation, $1,500,000; Houston Endowment Inc., $750,000; the Moody Foundation of Galveston, $200,000; the Fondren Store Foundation, $100,000; Foley Brothers Foundation, $15,000; and miscellaneous funds, $313,972.

Although the architects' final drawings are not completed, the proposed plans call for additions to four areas of the present structure which will:

- Permit the addition of new basic science programs in immunochemistry, clinical physiology, and experimental pharmacology and therapeutics, and the elaboration and expansion of existing programs in immunology, virology and nuclear medicine. Space will be allowed for training students in the basic sciences, for laboratories for visiting scientists, and for further development of a computer data processing system.
- Permit the expansion of medical specialty studies.
- Provide a diagnostic clinic for new patients separate from the overcrowded follow-up and special service clinics.
- Provide more storage room for research and treatment supplies.
- Allow relocation of some offices and departments to give more space and to locate all personnel next to their primary work areas.
- Provide adequate animal facilities.
- Provide more areas for intensive care and postoperative recovery.

Associate architects for the project are MacKie and Kamrath of Houston. Consulting architects are Jessen, Millhouse, and Greeven of Austin.

Nobel Winner Speaks

Nobel Prize winner Severo Ochoa, professor of biochemistry at New York University School of Medicine and one of this country's most distinguished biochemists, was guest speaker at a recent MDAH research seminar on molecular biology. Dr. Ochoa spoke on "RNA Synthetase, an Enzyme Induced in E. coli by the RNA-Containing Phage MS 2."

In 1955, Dr. Ochoa isolated an enzyme capable of breaking down ribonucleic acid (RNA) and, under suitable conditions, of catalyzing RNA synthesis. For this work, Dr. Ochoa, with Dr. Arthur Kornberg, received the 1959 Nobel Prize in medicine.

Through the impetus that Dr. Ochoa imparts to his field of research, scientists eventually hope to understand the principles of cell replication. Then control and eradication of many diseases, including malignant ones, may be realized.
New Electron Microscopes

As part of its expanding research program, MDAH has, within the last few months, installed three additional electron microscopes for use in research by members of several of the tumor institute departments and sections.

Until last summer, MDAH had only one electron microscope, given by the West Foundation several years ago and used principally by the staff of the section of virology and electron microscopy. Within the past year, however, funds for several new scopes have been given to the hospital and designated specifically for that purpose.

Mr. and Mrs. Theodore N. Law of Houston gave $47,000 to the hospital for purchase of an electron microscope which will be used by Dr. Jeffrey Chang, associate biologist in the section of experimental pathology, and members of his section.

One of Dr. Chang’s current research projects is on the histochemistry and ultrastructure of neoplasia, a study which demands the high magnification powers of an electron microscope. Dr. Chang is also working to develop new techniques and instruments for improved histopathologic diagnosis of cancer, and studying azo dye carcinogenesis.

The gift for this scope was made through the Law Foundation, established by Mr. and Mrs. Law for philanthropic purposes. Dr. R. W. Baird, Jr., clinical assistant internist at MDAH, is medical director of the Foundation.

A grant amounting to $35,000 was given to the hospital by the American Hereford Association, for purchase of another microscope. This scope will be used for a study on the developmental pathology and etiology of bovine ocular squamous carcinoma (cancer eye) and associated benign ocular lesions (pink eye). This study is being conducted by Dr. William O. Russell, pathologist, and Dr. Leon Dmochowski, virologist, with Dr. John A. Sykes, associate virologist.

Dr. Dmochowski is also conducting research on human leukemia, mouse leukemia, and a mouse mammary tumor-inducing agent, for all of which he uses the electron microscope.

A third scope has been purchased by the hospital with grant funds from the National Cancer Institute. This scope will be used by Drs. Robert J. Shalek and Arthur Cole and other members of the physics department in studies on phage particles and isolated mammalian chromosomes. A used scope, purchased by the hospital with other accumulated gift funds, has been used in the department of physics for the experimental development of new techniques and methods in electron microscopy.

Finally, still another electron microscope is currently on order. This scope, also being purchased with National Cancer Institute grant funds, will be used by members of the pathology department. Sometime during the year, another scope will probably be ordered for use by the section of virology and electron microscopy, whose work has accumulated to the extent that several months of microscope time are now required to bring the studies to a current status.

When all the scopes are received and installed, the hospital will have a total of seven. Three of these will be located in the section of virology and electron microscopy, two in the physics department, and two in the pathology department.

Visitors at MDAH

MDAH frequently is host to visitors of great prominence in cancer research and/or treatment. Several such visitors recently came to MDAH, both to learn and to share knowledge. Some of these visitors include:

Prof. Johannes Clemmesen, director of pathology at the Finesen Institute and head of the Cancer-Registeristé in Copenhagen, Denmark. Prof. Clemmesen, a widely known epidemiologist, visited MDAH in December to inspect the facilities and workings of our cancer record registry.

Prof. Lucio Severi, director and dean of the division of cancer research at the School of Medicine at the University of Perugia, Perugia, Italy, visited MDAH in February. While here, Prof. Severi spoke at a molecular biology research seminar on “The Hormone-Dependent Mammary Tumors in the RIII Dm/Sc/Substrain Mice.”

Prof. Fernando Gentil, chief of surgical services at the Cancer Institute of Hospital A. C. Camargo in Sao Paulo, Brazil, visited MDAH in February also. Prof. Gentil is currently serving as chairman of the Committee on Patient Care of the International Union Against Cancer, and stopped at MDAH after an interim meeting of the Union in Mexico City.

Two other distinguished guests visited MDAH on their return home from the interim meeting of the International Union Against Cancer. Dr. Ralston Paterson, now retired, is the former director of radiotherapy at the Christie Hospital and Holt Radium Institute in Manchester, England. His wife, Dr. Edith Paterson, is also retired. She was formerly radiobiologist at the hospital and institute.

Tumors of the Skin

A collection of papers presented at the Seventh Annual Clinical Conference on Cancer, Tumors of the Skin, was published in January in a volume entitled *Tumors of the Skin*. The Seventh Clinical Conference, sponsored by MDAH and The University of Texas Postgraduate School of Medicine, was held in November, 1962.

Those wishing to purchase copies of *Tumors of the Skin* may order them from Year Book Medical Publishers, Inc., 35 East Wacker Drive, Chicago 1, Illinois. The price is $8.50.
Grants Support MDAH Research and Education

Twenty grants have been awarded to MDAH in support of research and education.

The division for cancer research of the U.S. Public Health Service made awards to the following investigators:

Daniel E. Bergsagel, associate internist, section of experimental hematology, will study the plasma factors required for the formation of blood thromboplastin. He hopes to determine why the plasma coagulation factors exist as inactive precursors which are converted to more active forms during clotting. He will separate the factors in biologically pure, precursor forms from plasma, and investigate the sequence of reactions that occurs between activated Factor XII, Factors XI, IX, VIII, and V, calcium and phospholipid.

Beaury C. Burns, assistant gynecologist, will estimate radiocurability in patients with cervical carcinoma by measuring the multinucleate buccal cell responses occurring after test irradiation to the mucous membrane of the mouth. Following irradiation for cervical carcinoma, palpable fibrosis may occur, concealing recurrent disease. A refined method of predicting radiation response will enable the gynecologist to better select treatment modalities for individual patients.

Gilbert H. Fletcher, head of the department of radiology, received three grant awards. The first is a training grant supporting trainees in the following areas: (1) radiation therapy, 4 years at the postdoctoral level; (2) radiological physics, 1 to 2 years at the postdoctoral level; and (3) radiation biophysics, at both the pre- (M.S. and Ph.D.) and postdoctoral levels. The grant also provides funds to bring specially qualified speakers to lecture at seminars for staff members and trainees, and for consultants to the program.

Another grant was given Dr. Fletcher to evaluate results for more than 7,500 patients treated with several different modalities of supervoltage equipment. Therapy results will be evaluated for the following types of tumors: head and neck squamous cell carcinomas; uterine cervix cancers; urinary bladder tumors; lymphomas; breast carcinomas; and ovarian cancers. Careful follow-up is conducted for each patient. The aim of the study is to establish a firm basis for the use of the modalities.

Dr. Fletcher’s third grant is for the initiation and development of radiation therapy studies. A committee for radiation therapy studies will investigate those factors of clinical or scientific activity essential to therapeutic radiology and will help coordinate activities with other medical specialty groups responsible for the design and execution of clinical trials which involve ionizing radiation.

Felix L. Haas, head of the department of biology who also received a grant, is studying the relationship of DNA synthesis to radiation-induced mutation in bacteria. His approach to the problem is by: investigating the effect of preirradiation metabolism and nutritional environment on radiation-induced mutation; studying the interrelationships between RNA, DNA, and protein synthesis following irradiation and their effects on mutation induction; and studying the biochemistry of mutation induction by in vivo and in vitro treatments of bacterial-transforming DNA.

John E. Healey, Jr., chief of the section of experimental surgery, who is studying the effects of chemotherapeutic agents on the liver, received support for his work. In his study, various agents will be administered by perfusion to the intact isolated canine liver. The maximum tolerated dose for each drug will be determined by survival of the animals and by the morphologic appearance of the hepatic cells (determined by interval liver biopsies). Control and interval perfusion liver function studies will be done to evaluate any alteration in the physiological activities of the liver caused by the drugs.

Robert B. Hurlbert, chief of the section of nucleotide metabolism, was awarded a grant to continue studies on the role of deoxynucleotides in biosynthesis. The enzyme system in Novikoff rat tumor responsible for the reduction of cytidine diphosphate to deoxycytidine diphosphate is being used. Dr. Hurlbert, working with Dr. E. Colleen Moore, hopes to purify the auxiliary enzyme and cofactor which couple TPNH to the nucleotide reduction reaction, and compare these tumor factors with the corresponding factors from bacteria. The inhibition of ribonucleotide reduction by deoxyriboside triphosphates will also be studied.

Robert F. McGregor, assistant biochemist in the section of research clinical pathology, will, with the aid of his grant, study the hypothesis that steroids (estrogens) exert biological activity by selective insertion into phospholipide membranes of cells and cell organelles. This will involve investigating the action of estrogens on phospholipides of the liver, adrenals, kidneys, and kidney tumors of the male golden hamster. Since estrogens produce a hormonally dependent tumor in the hamster kidney, localization of labeled estrogens in phospholipides of cell particulates will be correlated with changes in phospholipides and phospholipide metabolism.

William O. Russell, head of the department of pathology, has received funds to help support a program devised to provide a facility for research and education in clinical pathology in a cancer institute. New information from the physical and biological sciences will be rapidly processed for clinical application to reduce the current time lag. New and improved clinical laboratory procedures will be developed for determinations of known and new substances in blood and urine. Computer techniques will be utilized to produce laboratory results by biometric analysis and to store and retrieve information for literature research in the physical and biological sciences. Academic training for clinical pathologists will be provided.

Robert J. Shalek, head of the department of physics, will study radiation effects on dilute solutions of lysozyme. With his grant award, he will investigate the effectiveness of sulphydryl compounds in reducing radiation sensitivity of dry lysozyme by utilizing gamma rays, helium-4, helium-3, deuterons, and protons as ionizing radiations. He will also conduct kinetic studies involving sulphydryl compounds, oxygen, and lysozyme in dilute solutions under the action of radiation. The rate constants for the reactions involved will be determined.

Joseph G. Sinkovics, assistant internist, department of medicine, who is studying the complex pathogenicity of malignant tissues, will utilize his grant to analyze the main pathological conditions associated with the inoculation of malignant human tissues and extracts into newborn animals. Early nonmalignant conditions (rutting, hemorrhagic disease, etc.) may be better sources of oncogenic viruses than advanced, well-grown tumors known to be associated with various disturbing factors such as passenger viruses, inhibitors, and iso-immune lymphoid cell clones.

Darrell N. Ward, head of the depart-

(Grants, continued on Page 5)
Eighteenth Annual Symposium

A total of 665 delegates from the United States and seven foreign countries attended the Eighteenth Annual Symposium on Fundamental Cancer Research held in Houston on March 2, 3, and 4. The annual symposia are sponsored by The University of Texas M. D. Anderson Hospital and Tumor Institute.

The topic for the 1964 symposium was “Cellular Radiobiology.” Featured on the program were 25 speakers and 14 major discussants who presented recent findings dealing with general research in cellular radiobiology and its possible implications for cancer control.

Subjects discussed at the different sessions of the meeting included the following: radiation effects on macromolecules and replication of cellular structures; critical structures in radiation phenomena; and modification of radiation response.

Other symposium topics were: radiosensitivity in the replication cycle of cells and its relation to fractionation in radiotherapy; and responses in mammalian cells and the implications for radiotherapy for cancer.

BERTNER AWARD

Highlighting the three-day symposium was the presentation of the fourteenth Bertner Foundation Award for outstanding achievement in cancer research. This year’s award recipient was Louis Harold Gray, distinguished radiobiologist from Mount Vernon Hospital and The Radium Institute, Northwood, Middlesex, England.

In presenting the award, Dr. R. Lee Clark, MDAH Director and Surgeon-in-Chief, pointed out Dr. Gray’s initial outstanding contribution to the cancer problem—the Bragg-Gray law. This law quantifies the relationship between ionization in a gas cavity and energy absorption in the surrounding solid medium, and thereby provides the basis for radiation dosimetry.

The symposium was co-sponsored by The University of Texas Graduate School of Biomedical Sciences at Houston, the National Cancer Institute, and the Texas Division of the American Cancer Society.

Dr. Robert J. Shalek, head of the MDAH department of physics, was chairman for the 1964 Symposium. Assisted by a committee of other MDAH staff members, Dr. Shalek was responsible for the over-all organization of the research meeting.

Dr. Healey has also received a grant from Ethicon, Inc., for continuation of studies already begun in the nonsuture repair of body tissue with a plastic adhesive. Tissues under experimentation include blood vessels, intestines, bile ducts, and ureters. The nonsuture repair is being used for stump closures. The grant will also support work to determine the effectiveness of a new adhesive compound, isobutylcynoacrylate.

T. C. Hsu, chief of the section of experimental cytology, has received a grant from the National Science Foundation to study North American mammals cytogenetically and phylogenetically. Using modern techniques, researchers can now study all mammals, their chromosomes, and learn how many are in each species, and their characteristics. Karyotypes from all mammals will be collected and kept in a museum, to be on loan for other researchers. Further studies will allow comparison of the different chromosomes from which the evolutionary sequence may eventually be traced.

Dr. Hurlbert also received a grant from the American Cancer Society to study biosynthesis of nucleotide and polynucleotide pyrimidines in tumor tissue. It is believed that most if not all RNA in cells is synthesized in the nuclei, and a large part of that in the nucleoli. Dr. Hurlbert will study messenger RNA, which carries information from the genes to the cell. He is currently working to isolate the nuclei of rat tumor cells in order to find what kind of RNA the nuclei are synthesizing. He is isolating the nucleoli from the nuclei and studying their RNA synthesis also.
MDAH Doctors on Television

MDAH staff members were seen Sunday, March 29, on nationwide television in Breakthrough, a special program seen only a few times a year. The topic for that night's program was "Medicine—The Shape of the Future."

The MDAH doctors were Dr. John E. Healey, Jr., associate experimental surgeon and chief of the section of experimental surgery; Dr. Richard H. Jesse, Jr., associate head and neck surgeon; and Dr. Kamal S. Sheena, assistant experimental surgeon.

The portion of the program featuring the doctors' work, dealt with a method for tissue repair studied experimentally at MDAH. The method involves the use of a fast-setting plastic glue, Eastman 910, which can be used to join severed tissues together.

On the television program, the glue was shown as it is used for plastic surgery. Instead of suturing a skin graft onto a patient, the piece of donor skin was cut slightly larger than the repair area, overlapped on the surrounding skin, and glued in place. In time, the glue disintegrates, leaving only the skin that has by then grown together, or healed.

On the program, Dr. Healey also explained how the glue can be used for repairing blood vessels and demonstrated the anastomat, a clamp, designed in the MDAH physics workshop, which holds the ends of even small vessels together while repairs are being made.

Also included on the Breakthrough program were television visits with noted doctors of other institutions who described other new medical techniques. These included the implantation of a human kidney from one sister to another; a freezing treatment for patients with stomach ulcers; an electrophysiological brace for stroke patients who walk with difficulty; and implantation of a plastic cornea into the eye of a man who would otherwise be blind.

Announcing the 1964 Symposium on Fundamental Cancer Research:

"Developmental and Metabolic Control Mechanisms and Neoplasia"

Dr. Darrell N. Ward, Chairman


