AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

FOR AID USE ONLY
BATCH #16

1. SUBJECT CLASSIFICATION

A. PRIMARY
Agriculture

AL72-0000-0000

B. SECONDARY
Pests of animals

2. TITLE AND SUBTITLE
Program,personnel,and facilities of Texas A&M program in tropical veterinary medicine at College Station,Texas and Bogota and Cali,Colombia

3. AUTHOR(S)
(101) Tex.A&M Univ. Institute of Tropical Veterinary Medicine

4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1970	51p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Tex.A&M

8. SUPPLEMENTARY NOTES *(Sponsoring Organization, Publishers, Availability)*

9. ABSTRACT

10. CONTROL NUMBER
PN-RAA- 786

11. PRICE OF DOCUMENT

12. DESCRIPTORS
Organizations
Professional personnel
Protozoan infections
Research

13. PROJECT NUMBER

14. CONTRACT NUMBER
CSD-1947 Res.

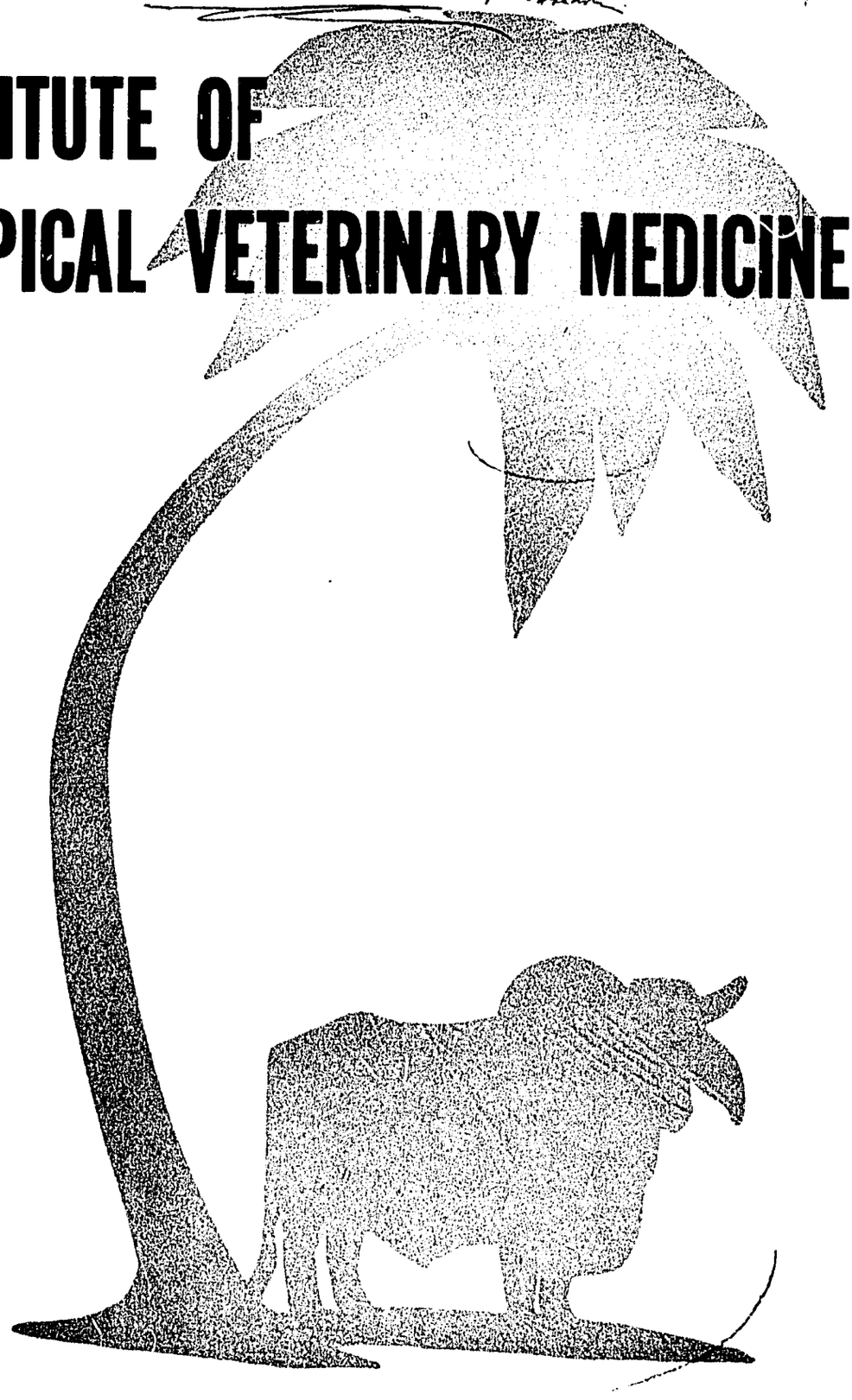
15. TYPE OF DOCUMENT

AID 590-1 (4-74)

PART II (page 44) HAS
PROGRESS REPORT FOR 1969

Pg 4

INSTITUTE OF TROPICAL VETERINARY MEDICINE



College of Veterinary Medicine

Texas A&M UNIVERSITY

PROGRAM

PERSONNEL AND FACILITIES

OF

TEXAS A&M PROGRAM IN TROPICAL VETERINARY MEDICINE

AT

COLLEGE STATION, TEXAS

AND

BOGOTA AND CALI, COLOMBIA

ROCKEFELLER FOUNDATION

AGENCY FOR INTERNATIONAL DEVELOPMENT

CENTRO INTERNACIONAL AGRICULTURA TROPICAL

AND

TEXAS A&M UNIVERSITY

TEXAS
Texas A.& M. University
Bryan-College Station
Montería
BOGOTÁ
Cali
COLOMBIA

Background: It is the purpose of this program in Tropical Veterinary Medicine to further the state and national welfare by contributing to the world's food supply through improved animal health and productivity. There is increasing justification for such an effort: Three-fourths of the world's people live in food deficient areas where over 3 million people die annually from malnutrition. Hunger tends to be localized in the most undeveloped regions of the world with the poorest communications so that there is not a general awareness of the malnutrition, disease, poverty, fear, bitterness, conflict and violence being spawned by hunger. If we wait until hunger spreads to dominate whole nations with the loss of social, economic and political stability fostering aggression, there will be no security for any nation.

If widespread starvation is to be prevented all potential food resources must be developed. There is a critical synergestic relationship between plant and animal production which makes them interdependent if either is to be most efficiently produced and utilized. Efficient total land utilization for food production requires optimal use of livestock to harvest and convert the great resources of natural forage and waste products of crop production into food for man.

While all types of food are needed, proteins are in most demand and most difficult to provide. Animal proteins are customarily utilized wherever people can afford them. Being complete proteins, a small amount per day will provide the essentials for growth and nutrition so that the rest of

the diet can be composed of whatever plant foods are available.

Animal proteins are most readily consumed in adequate quantity even by children, following the processing available in a primitive environment.

The potential for more efficient and more abundant livestock production is great in most regions of the world. Development of this potential requires improved animal nutrition, breeding, management, marketing and disease control.

Control of the major infectious and parasitic diseases is usually the key to improved cattle production in the tropics because indigenous disease is not only prevalent but it commonly prevents both the importation of improved breeding stock and exportation of animals to foreign markets. Livestock producing countries are greatly handicapped without access to foreign markets which could provide the capitol so essential for development.

The opportunity to improve animal productivity through disease control is evident in the contrast between countries without a veterinary service where losses frequently exceed 50% as compared with less than 15% loss in the United States. Disease prevention followed by improved nutrition, breeding and management account for the fact that only 40% of the world's livestock in the developed countries provide 80% of the world's meat, milk, and eggs. When the undeveloped countries can do as well, they will have gone a long way toward provision of the animal protein they need.

With only 10 countries having a surplus of food and these countries containing only 15% of the world's population, it is evident that they will not long

be able to make up the deficits. Since we cannot provide the food, we must help the people of undeveloped countries to increase their own food production. Experience has shown that this can best be done through adaptive research to apply known methods to disease problems in a foreign environment and to conduct research for the development of new control methods. Both approaches require experienced research people who are also capable of training both American and foreign graduate students.

It is for these reasons that we have established an Institute of Tropical Veterinary Medicine at the College of Veterinary Medicine, Texas A&M University.

We believe there is a need and a responsibility to conduct such a research and training program at Texas A&M, where conditions for the study of tropical and wildlife diseases are believed the most favorable of anywhere in the United States. Located as Texas is in a subtropical climate with abundant wildlife and domestic animal populations and a wide variety of arthropod vectors, we have acquired some of these exotic diseases and our staff has gained valuable experience in working with them.

Diseases of exotic origin such as bluetongue of sheep, babesiosis, theileriasis, piroplasmosis, anaplasmosis and Chagas disease appear in our clinics. There are some 10 million head of cattle and 4 million head of deer and antelope in Texas including some 30,000 exotic animals of 13 different species. There are some hemoprotozoan infections of presumed exotic origin in these ungulates. This wildlife provides us with an environ-

mental situation essentially like that in many tropical countries where wildlife plays a major roll in disease transmission and is an important factor in the control of livestock disease. This Texas environment has long provided an excellent opportunity for training, research and experience with some of the disease problems of undeveloped countries.

Our Objectives Are: To build a cadre of well trained, experienced faculty members with demonstrated ability to do productive research and train both domestic and foreign graduate students.

To conduct research aimed at the improved control and prevention of infectious diseases of the tropics giving priority to disease problems of food producing livestock which are of major economic importance.

To establish a fellowship program for the training of American graduate students in tropical veterinary medicine.

To maintain laboratories abroad for research and training with regional disease problems.

To collect and prepare a library of information and training aids for use in the training program at Texas A&M and abroad.

Support: Financial support for this program is being provided by the Rockefeller Foundation, the Agency for International Development, Contract AID/csd-1947, and Texas A&M University. The fiscal administration at the University level is handled by the International Programs Office.

Facilities support is being furnished in Texas by Texas A&M University which has provided a new research building with well furnished and equipped

research laboratories, two new animal buildings and stock pens for cattle and deer. In addition, the College of Veterinary Medicine has just completed a 4-1/2 million dollar expansion and remodeling of the College of Veterinary Medicine facilities for teaching and research. In Colombia, South America, the Rockefeller Foundation, the Instituto Colombiano Agropecuario (ICA) and Centro Internacional Agricultura Tropical (CIAT) have provided cooperative use of excellent well equipped research laboratories and field experimental stations.

Consultation and Reference Support: Placement of this program at Texas A&M University in the College of Veterinary Medicine has provided a corps of specialists for consultation, a modern veterinary library with over 500 journals; an Agricultural College with Departments of Nutrition, Animal Science, Genetics and Biochemistry, and Colleges of Engineering and Science all of which may be called upon to assist at home or abroad. To do research in remote foreign environments without a home base for reference material, consultation, supplies and equipment would be a serious handicap.

Fellowship Training: Support is available for three new two year fellows each fall. Selected veterinarians with an interest in Tropical Veterinary Medicine who are academically eligible may be awarded fellowships to work toward graduate degrees in microbiology, pathology, or parasitology. Candidates for Master's degrees spend the first year at Texas A&M completing the course work in their discipline and the

second year in Colombia doing their research on a tropical disease problem and in writing their thesis. The research abroad is conducted under the supervision of a senior staff member who is a member of the graduate faculty at Texas A&M.

These fellows receive a stipend of $7,000 per year. While abroad additional allowances are provided for housing, travel and dependent education.

Training in Colombia: Although Drs. L.G. Adams and R.A. Todorovic, Texas A&M faculty members, are primarily responsible for our research program in Colombia, they have also been actively engaged in the individual training of both American and Colombian graduate students doing their research for Master of Science degrees in veterinary pathology or microbiology.

Dr. Adams has taught one graduate pathology courses including formal lectures and laboratory demonstration in gross and microscopic pathology. He has also been responsible for weekly seminars in histopathology.

Drs. Todorovic and Adams have assisted as visiting professors in the teaching of undergraduate veterinary students in the faculty of veterinary medicine of the National University of Colombia in Bogota by giving seminars and by collaborating with the faculty on various research and training projects.

In collaboration with the Instituto Colombiano Agropecuario (ICA), Drs. Adams and Todorovic have taught hemoprotozoology in the presentation

of short courses for graduate veterinarians. They have also cooperated with (ICA) veterinary diagnosticians in the diagnosis of numerous diseases.

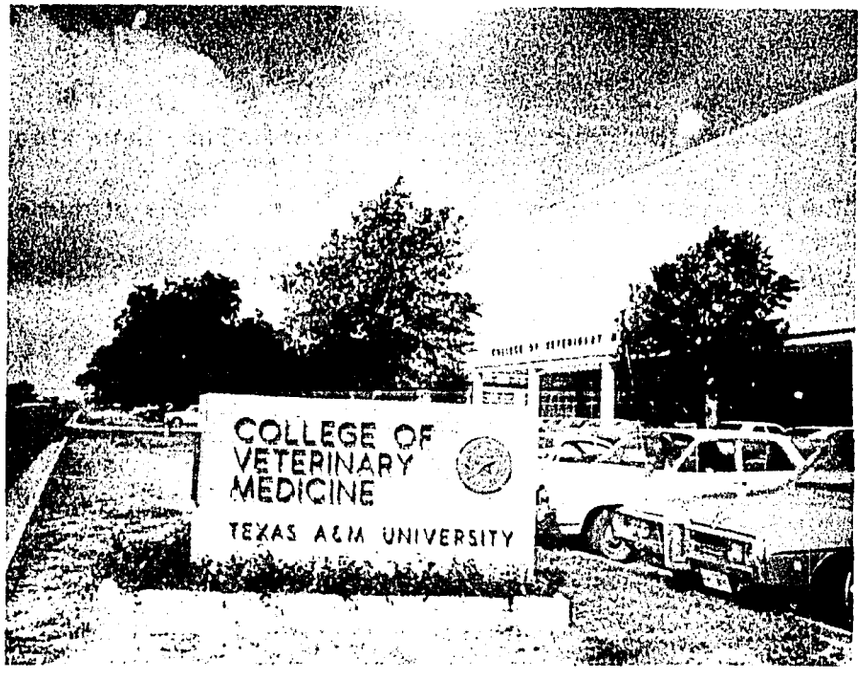
College Buildings and Facilities: The graduate training program is accomplished primarily in the Departments of Veterinary Microbiology, Pathology and Parasitology which have excellent new classrooms, laboratories and equipment for the use of graduate students in the new and remodeled buildings of the College of Veterinary Medicine.

Research Buildings and Facilities: At Texas A&M, the research activities of the program are housed primarily in three new metal buildings located on the College of Veterinary Medicine Research Farm. One of these contains laboratories, offices, equipment rooms and a complete necropsy suite.

A vivarium building adjacent to the main laboratory building has animal rooms, a cage washing facility, a small laboratory and a work room for graduate students.

Across from the vivarium is a new large animal research facility providing 28 individual animal pens, a clinical working area, and a large enclosed feed and storage room.

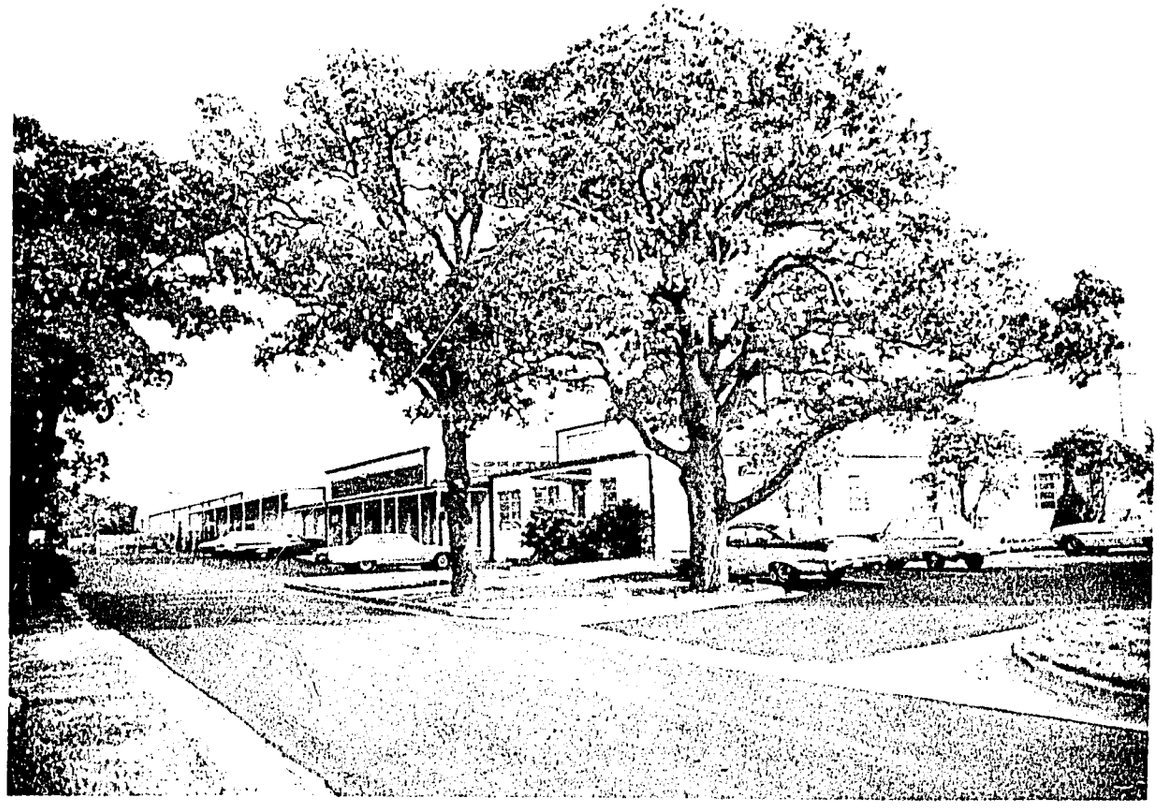
These three buildings were built during the past three years with State funds for the Institute of Tropical Veterinary Medicine. The State has also provided roughly $55,000 worth of furnishings and equipment for these buildings.



The new building in the foreground houses the Veterinary Library, the Administrative Offices and the Departments of Pathology and Parasitology.

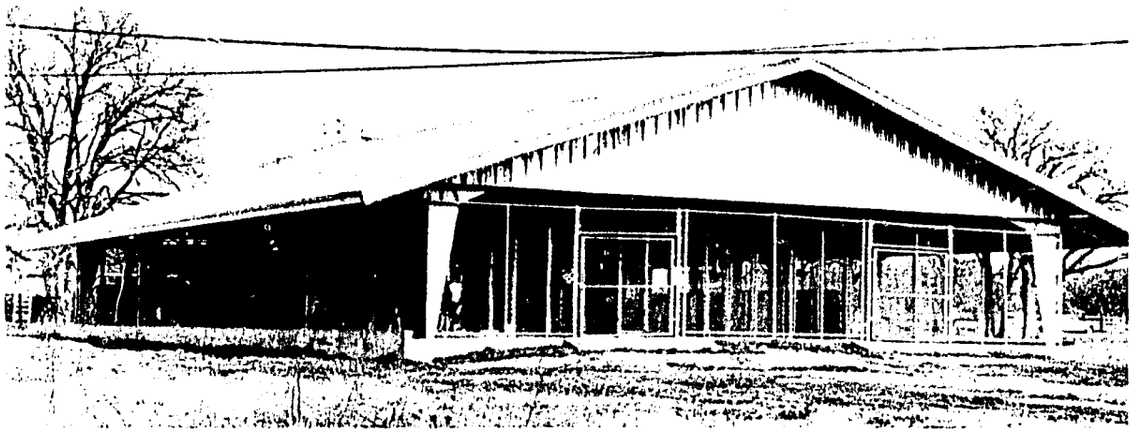
The building on the right provides space for Physiology, Microbiology and Public Health.

The Veterinary Hospital Front View



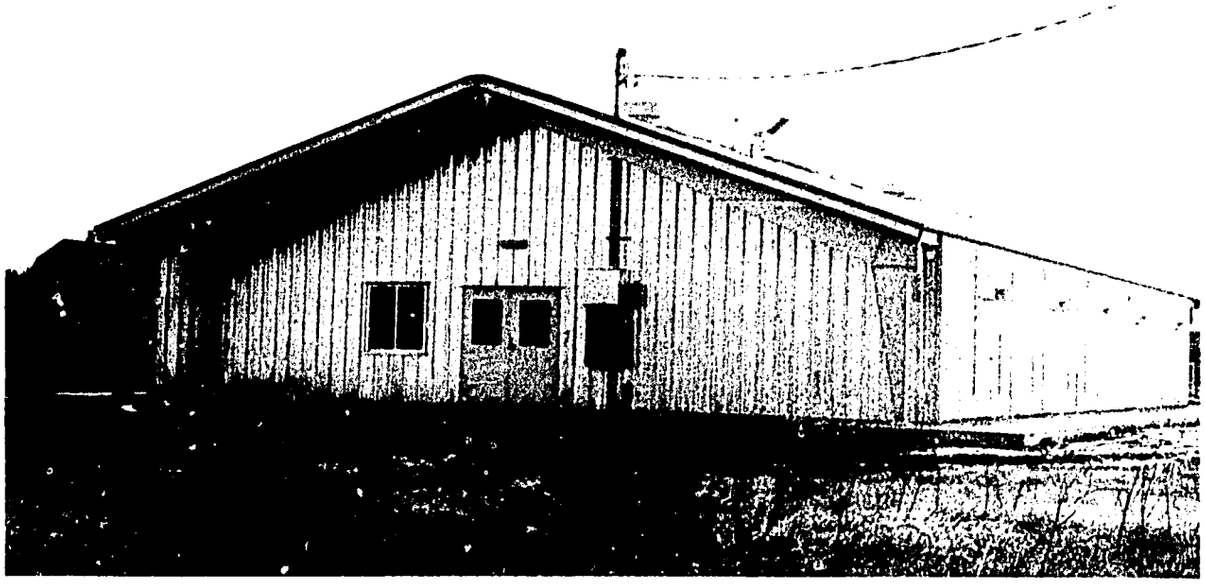
Veterinary Hospital and Clinics

Where the Department of Medicine and Surgery operates large and small animal clinics, an ambulatory service, and its teaching program.

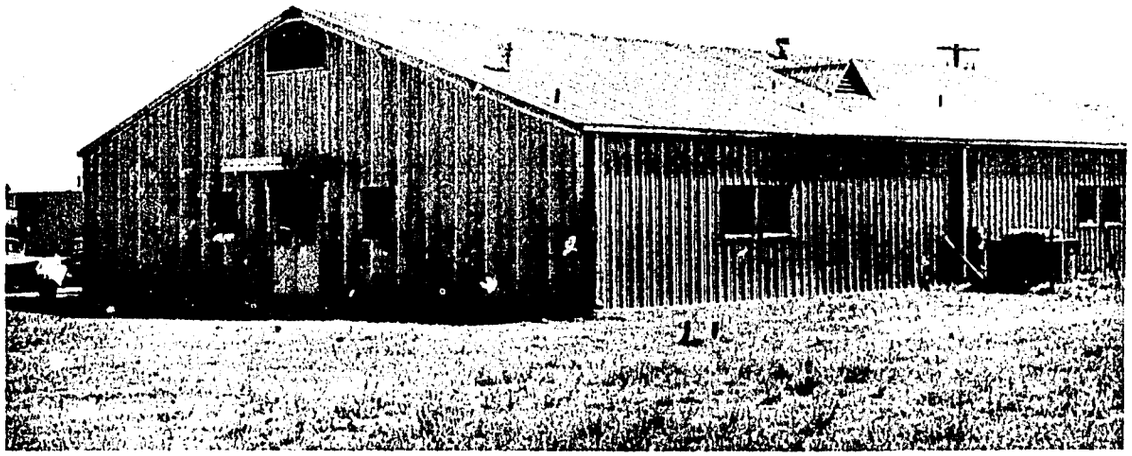


Large experimental animal holding facility (completed Feb. '69) 50 x 80 feet. This barn will hold 28 individually penned animals and includes a surgery area and feed storage unit.

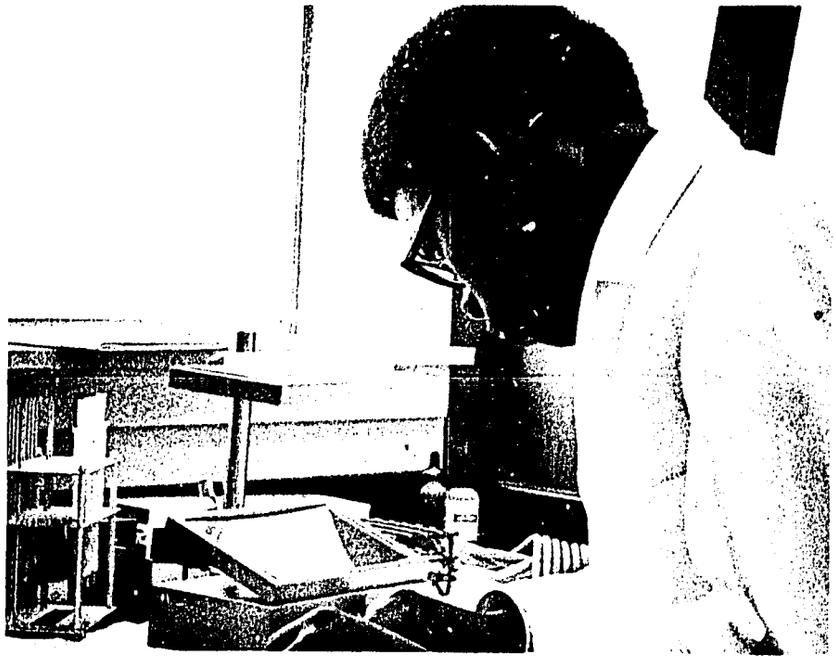
The historical barn used by Dr. Schmidt for his original work on Texas fever (bovine babesiosis), and anaplasmosis in 1906 is symbolic of the long standing interest in hemoprotozoan diseases at Texas A&M.



Main Laboratory Building, 50 x 80 Feet
(Tropical Veterinary Medicine)



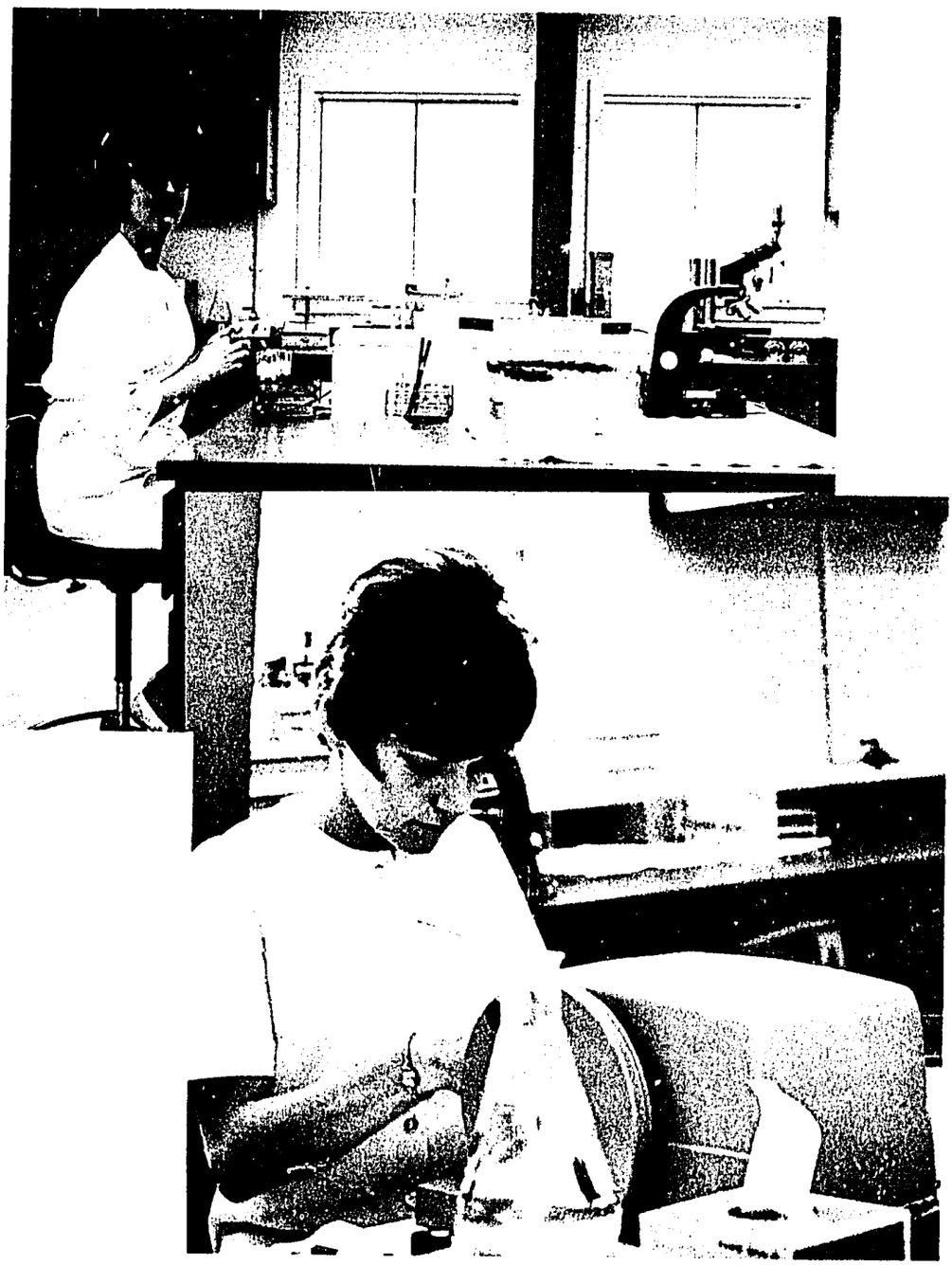
Vivarium, front view, 50 x 90 Feet (Completed Feb. '69)
(Tropical Veterinary Medicine)



Technical Assistant checks microtiter readings on a group of experimental Anaplasma-infected cattle.

Graduate Student from Sudan preparing a type specific antigen for theileriosis in white-tailed deer.

Technician in Serology Laboratory - Main Laboratory Building



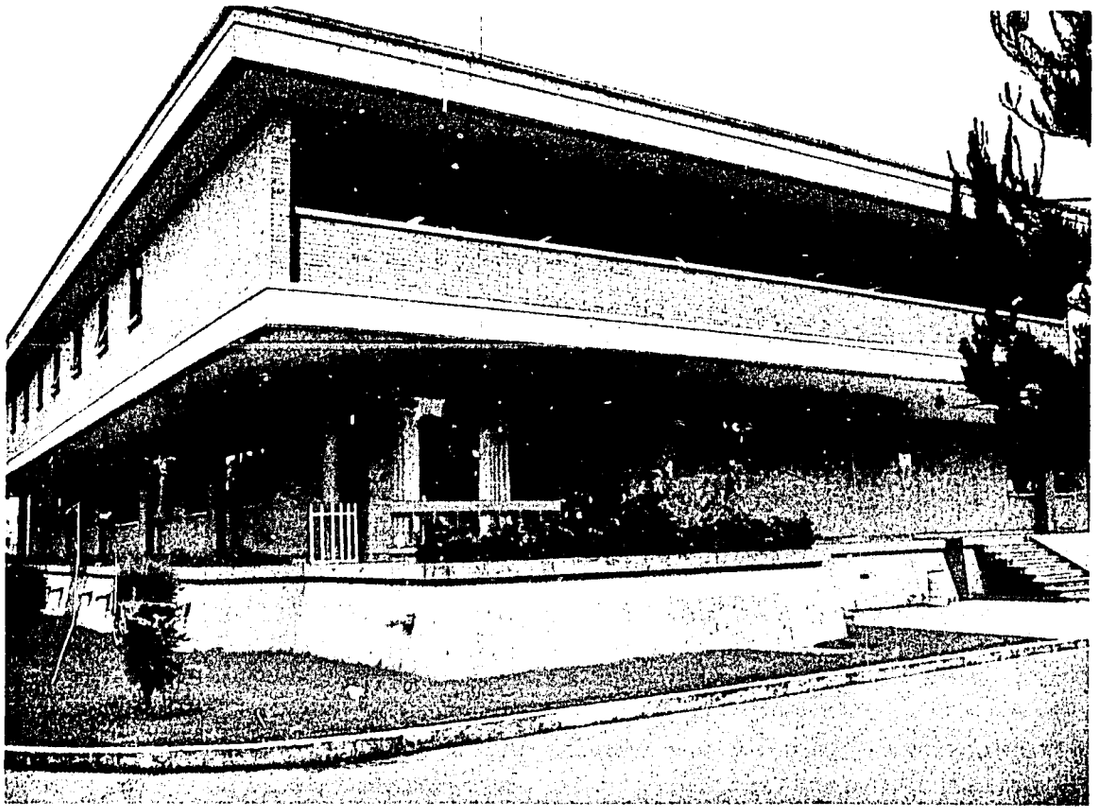
Preparing Histologic Sections, ITVM

Performing a Splenectomy on a White-Tailed Deer

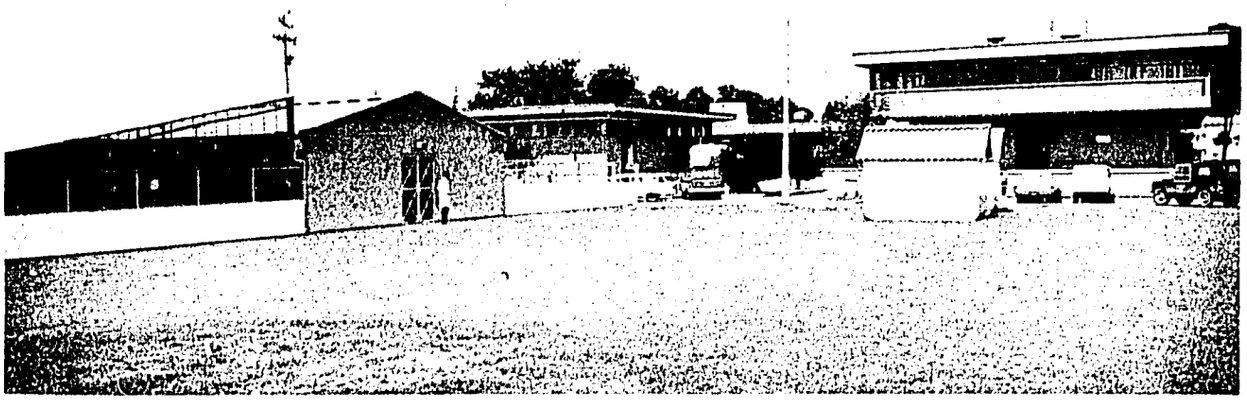
Examining Mice Inoculated with Babesia rodhaini

Facilities in Colombia:

Laboratory and animal space has been provided for this program by Instituto Colombiano Agropecuario in a large, modern, well equipped veterinary research laboratory situated near the National University of Colombia. The Rockefeller Foundation has contributed funds for equipping this laboratory. There are also several ICA livestock field stations located in different agricultural and geographic environments within the country where field research is in progress. Some illustrations of these facilities are on the following pages. In addition, a large new research center for tropical agriculture; Centro Internacional Agricultura Tropical (CIAT) is under construction near Cali, Colombia. Upon completion of this center, our program activities will move there from Bogota. This move will offer advantages of enlarged facilities and a more tropical environment at the main laboratory.



Laboratorio de Investigaciones Medicas Veterinarias (LIMV)
of ICA at
National University Bogota

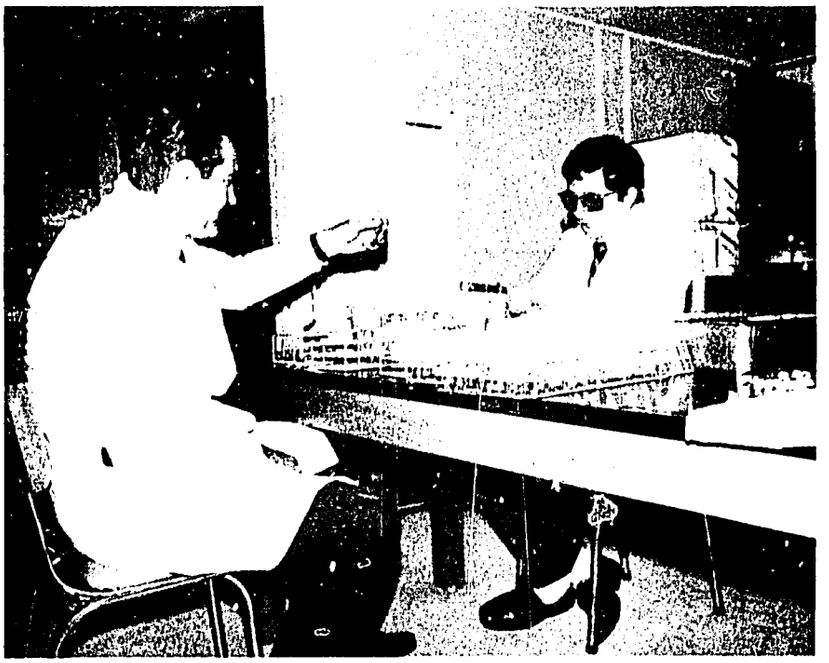


LIMV Buildings of ICA at National University Bogota

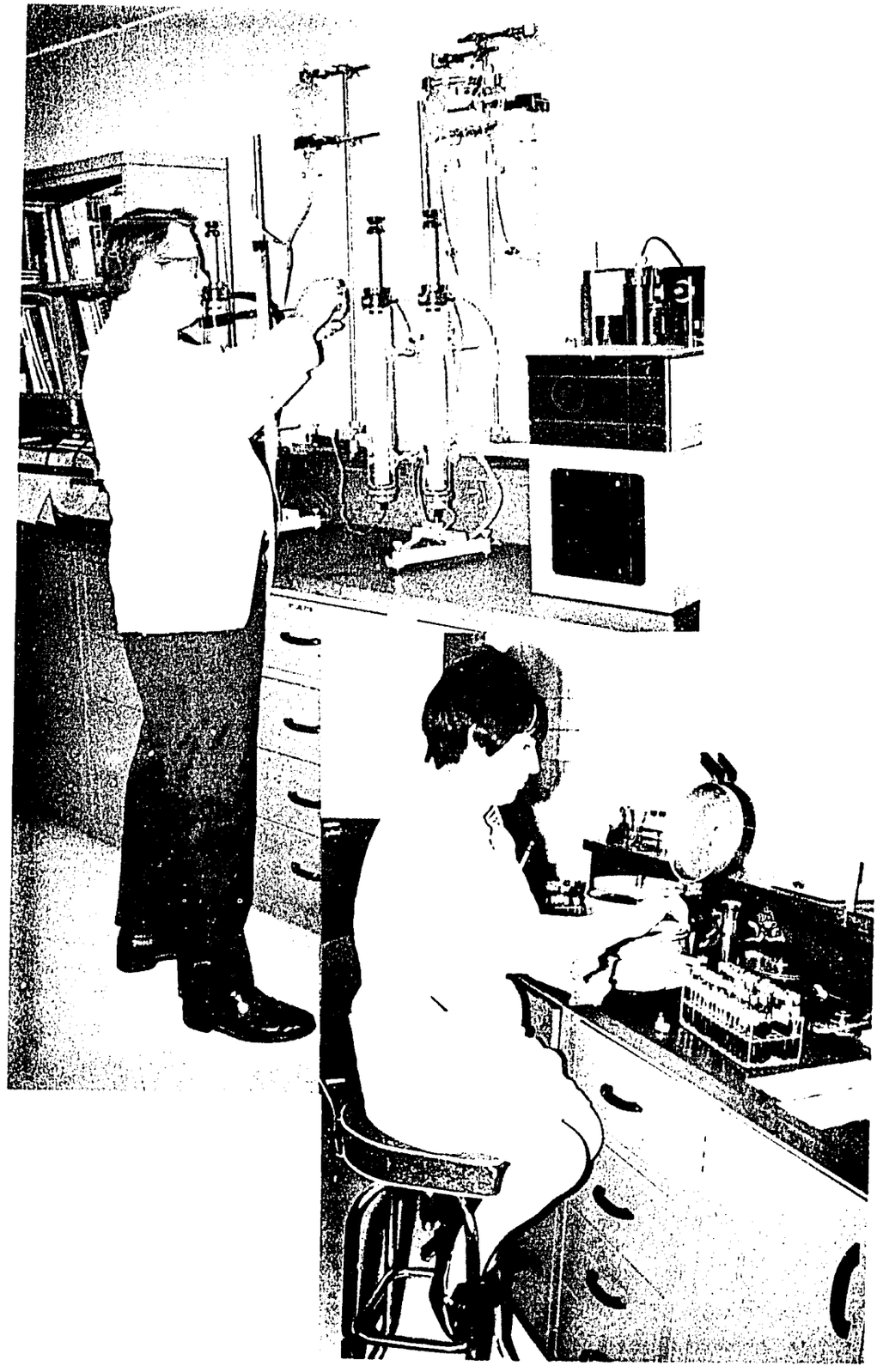
Isolation Stalls LIMV Laboratories

LIMV Laboratory Facilities - laboratory assistant

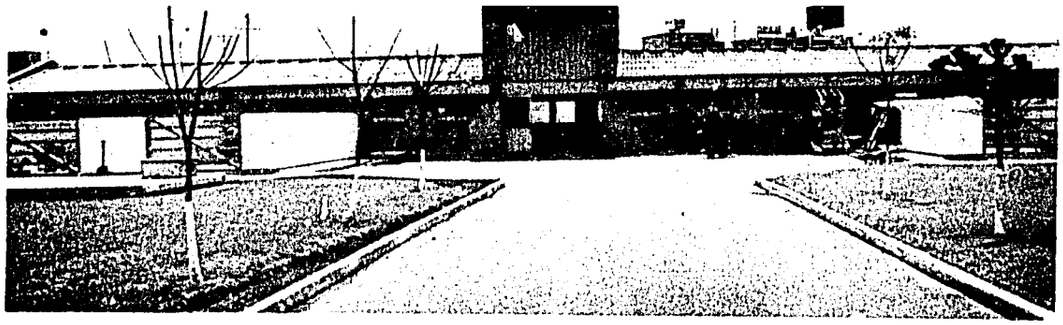
Obtaining a Blood Sample for Testing



Testing Bovine Blood Samples for Babesiosis



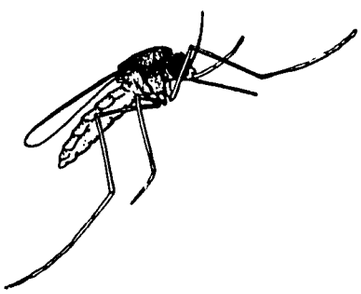
Laboratory Facilities - LIMV

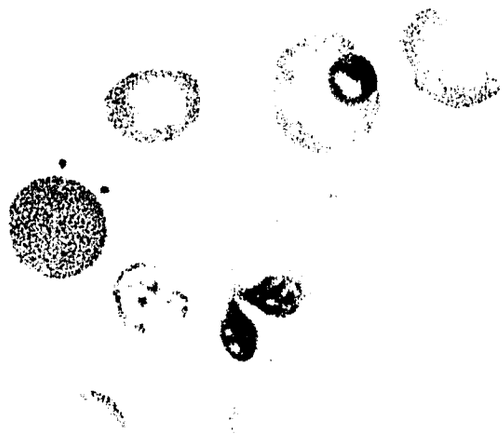


LIMV Experimental Animal Barn

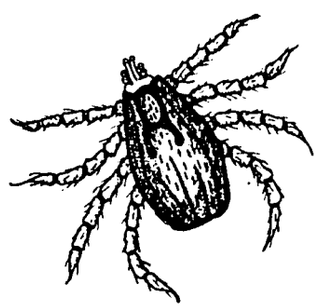
Experimental Calves Purchased Locally on Bogota Savannah

HEMOPROTOZOA CURRENTLY UNDER STUDY INCLUDE ANAPLASMA, THEILERIA, BABESIA, EPERYTHROZOA AND TRYPANOSOMA.

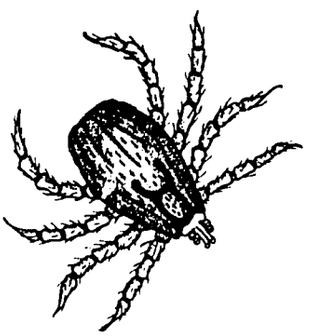


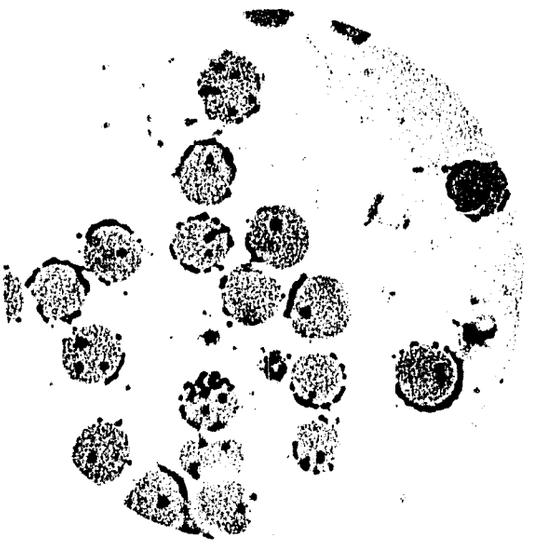


Babesia bigemina

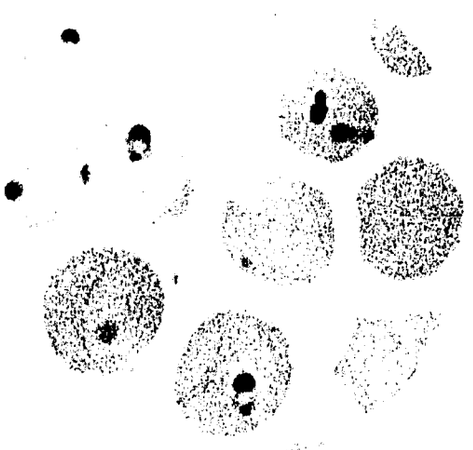


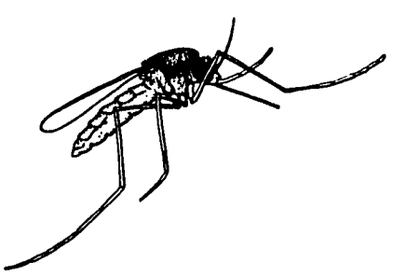
Anaplasma marginale





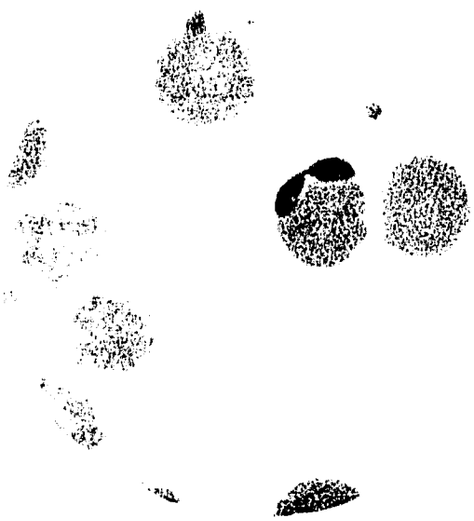
Eperythrozoan species,
splenectomized calf.



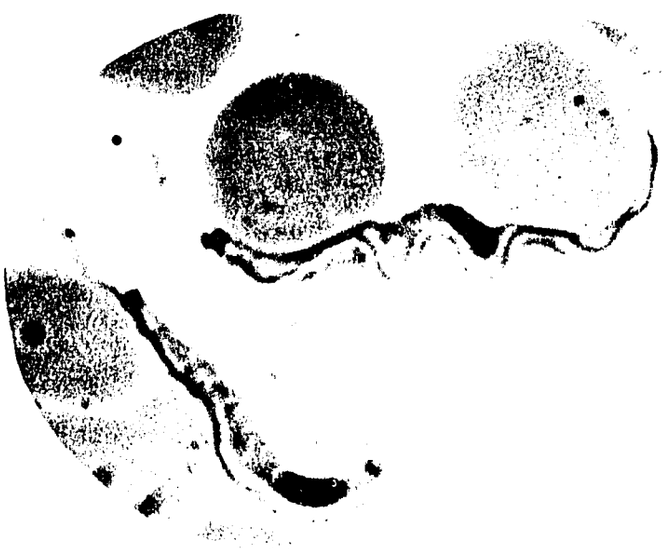


Theileria cervi
White-tailed deer.

Babesia rodhaini



Babesia cervi



Trypanosoma theileri

The Research Program: Initial efforts have been on hemoprotozoal diseases of cattle because as a group they are considered the greatest handicap to production and are of major economic importance in South America and throughout the tropical regions of the world. These diseases cause slow growth and development, reduce milk production, limit reproduction, and prevent the use of vast land areas in the tropics.

The research being conducted at Texas A&M is designed to complement that done in Colombia. In general, the work at Texas A&M is more basic in nature allowing greater latitude for an applied program in Colombia. The presence of competent resultants at Texas A&M in every discipline of veterinary medicine provides the support in depth so essential to a successful research program.

In Texas, Dr. Kuttler has been working full time on methods for improving the control of anaplasmosis and babesiosis in cattle as evidenced by the preceding list of his publications.

Dr. James S. Grimes, Assistant Professor of Veterinary Microbiology, is doing research on anaplasmosis and babesiosis with emphasis upon the reparation and evaluation of antigens which are vital for serologic testing and vaccine development.

Dr. Richard Hidalgo, Associate Professor in the Department of Veterinary Microbiology has been working part time on the elimination of anaplasmosis carriers with drugs, and on the culture of Anaplasma organisms.

Dr. Richard Dennis, Assistant Professor in the Veterinary Pathology Department, and Dr. Mark Young, Associate Professor in the Department of

Veterinary Medicine and Surgery, are working on a fatal hemolytic anemia problem in calves which appears to be associated with vaccination of their dams with a commercial anaplasmosis vaccine containing bovine erythrocyte antigens. They have a paper in press.

Dr. Thomas J. Galvin, Associate Professor in the Department of Veterinary Parasitology, is conducting a survey by cultural methods for the presence and distribution of Trypanosoma theileri in Texas cattle. He is finding a high incidence and will proceed with a study of the disease. By serving as a model, the study of these trypanosomes here will facilitate the study of the more virulent forms in Colombia.

A substantial portion of the research, especially on those diseases which do not occur in the United States, needs to be done in the tropics because numerous features of the tropical environment are factors in the epidemiology, transmission, pathogenicity and host range of the pathogens. The state of health and nutrition of the animal, the degree of parasitism, the genetic qualities of the breed, its degree of adaptation to the environment, intercurrent infections, husbandry and management practices are all factors being considered in the health and production improvement program.

In Colombia, Dr. Garry Adams and Dr. R. Todorovic are training both American and Colombian graduate students and doing research toward the improved control of anaplasmosis, babesiosis, and trypanosomiasis of cattle. They are studying the epidemiology of these diseases and their vectors, developing and evaluating vaccines under both laboratory and field conditions.

Program Personnel: Listed below is the program staff with indication of areas of major interest. A more detailed resume of the educational background and experience in Tropical Veterinary Medicine for each staff member is provided in the Appendix.

Research Staff:

At the College of Veterinary Medicine, Texas A&M University:

Fred D. Maurer, DVM, PhD, Program Director, infectious diseases of food-producing livestock. (State Salary)

K. L. Kuttler, DVM, PhD, Associate Director, hemoprotozoan diseases of cattle and wildlife. (AID Support)

James E. Grimes, BA, MA, PhD, Department of Veterinary Microbiology, half-time research on anaplasmosis and babesiosis with emphasis on antigentic studies. (1/2 AID, 1/2 State Support)

Richard J. Hidalgo, DVM, MS, PhD, Department of Veterinary Microbiology, part-time research on anaplasmosis with emphasis on the use of drugs to eliminate carriers and on cultivation of the organism. (State Support)

Richard A. Dennis, DVM, MS, PhD, Department of Veterinary Pathology, part-time research on hemolytic anemia of calves believed associated with an anaplasmosis vaccine. (State Support)

Mark F. Young, DVM, MS, Department of Veterinary Medicine and Surgery, part-time research on the calf anemia problem with Dr. Dennis. (State Support)

Thomas J. Galvin, DVM, MS, PhD, Department of Veterinary Parasitology, part-time research on trypanosomiasis of cattle. (State Support)

At Bogota, Colombia:

Garry Adams, DVM, PhD, Leader Colombian Team, pathology of infectious diseases. (AID Support)

Radmilo Todorovic, DVM, PhD, hemoprotozoan diseases of livestock. (AID Support)

E. D. Roberts, DVM, PhD, Pathologist, Graduate Faculty
Texas A&M. (Rockefeller Foundation Staff)

In support of the training program, the faculty of the Departments of Microbiology, Pathology and Parasitology of the College of Veterinary Medicine provide the academic training for the graduate fellows.

Academic Staff:

Heads of These Departments Are:

Leland Grumbles, DVM, MS, Microbiology

Charles Bridges, DVM, MS, PhD, Pathology

Rural Bell, DVM, MS, PhD, Parasitology

Consultants:

John Pino, PhD, Rockefeller Foundation

Nels Konnerup, DVM, Agency for International Development

Graduate Students:

U.S. Graduate Students - Currently at Texas A&M

		Candidate For
Donald Corrier, BS, DVM	Pathology	MS
Kenneth Thompson, BS, DVM	Microbiology	MS
John Bishop, DVM, MS	Microbiology	PhD

Foreign Graduate Students - At Texas A&M, who are associated directly or indirectly with Tropical Veterinary Medicine.

George Corry,	Microbiology	Kenya	MS
Hernan Zaraza	Microbiology	Colombia	MS
Faisal Gadir	Microbiology	Sudan	MS

Foreign Veterinarians - In Colombia, who are participating in the training provided by our staff there.

Ontoniel Vizcanio	Jose Hernandez	Wilson Ferreira
Eduardo Gonzales	Hector Munoz	Fernando Lozano
Fernando Lozano	Jaime Payan	Fernando Botero
Adolfo Arboleda		

PUBLICATIONS AND MANUSCRIPTS PREPARED BY INSTITUTE STAFF SINCE 1967, DEALING WITH HEMOTROPIC INFECTIONS

Kuttler, K. L., Robinson, R. M.: A Capillary-Tube Agglutination Test for the Detection of Theileria Infections in White-Tailed Deer (Odocoileus virginianus). Southwestern Vet. 21 (1967), 51-55.

Kuttler, K. L.: Serological Relationship of Anaplasma marginale and Anaplasma centrale as measured by the Complement-Fixation and Capillary-Tube Agglutination Tests. Res. in Vet. Sci., 8 No. 2 (April, 1967), 207-211.

Robinson, R. M., Kuttler, K. L., Thomas, J. W., and Marburger, R. G.: Theileriasis in Texas White-Tailed Deer. The J. of Wildlife Management, 31 (July, 1967), 455-459.

Kuttler, K. L.: A Study of the Immunological Relationship of Anaplasma marginale and Anaplasma centrale. Res. in Vet. Sci., 8 (October, 1967), 467-471.

Kuttler, K. L., Robinson, R. M., Bell, R. R.: Tick Transmission of Theileriasis in a White-Tailed Deer. Bull. Wildlife Disease Assoc., 3 (October, 1967), 182-183.

Kuttler, K. L., Robinson, R. M., Rogers, W. P.: The Detection of Specific Complement-Fixing Antibodies in Serum of White-Tailed Deer (Odocoileus virginianus) with Theileria Infection. Canad. J. of Comp. Med. and Vet. Sci., 31, No. 12 (December, 1967), 453.

Kuttler, K. L., Robinson, R. M., Rogers, W. P.: Exacerbation of Latent Erythrocytic Infections in Deer Following Splenectomy. Canad. J. of Comp. Med. and Veterinary Sci., 31 (December, 1967), 317.

Kuttler, K. L., Robinson, R. M., and Franklin, T. E.: Serological Response to Anaplasma marginale Infection in Splenectomized Deer (Odocoileus virginianus) as Measured by the Complement-Fixation and Capillary Tube Agglutination Tests. Proceedings of the 5th National Anaplasmosis Conference. February 28-29, 1968, Stillwater, Oklahoma.

Kuttler, K. L., Zaraza, H., and Roberts, E. D.: Hematologic and Clinical Response to Anaplasmosis Vaccines and the Comparative Efficacy of these Vaccines, as Measured by Field and Experimental Challenge. Proceedings of the 5th National Anaplasmosis Conference. February 28-29, 1968. Stillwater, Oklahoma.

Robinson, R. M., Kuttler, K. L., Emerson, H. R., Jones, L. P., and Marburger, R. G.: Blood Parasites in Texas Deer. (1968). Transactions of the 33rd No. Am. Wildlife and Natural Resources Conf., March 11, 12, 13, 1968. Washington, D.C.

Zaraza, H., Kuttler, K. L., Roberts, E. D.: Efectos de la Descarga Natural de Anaplasma marginale en Terneros Vacunados y no Vacunados. (Accepted for Publication in ICA Journal), 1968.

Zaraza, H., Kuttler, K. L.: Respuesta Hematologica y Clinica a Diferentes Vacunas de Anaplasmosis y la Eficacia Comparative de estas, Evaluadas por la Inoculacion Experimental. (Accepted for Publication in ICA Journal), 1968.

Kuttler, K. L., Adams, L. G., and Zaraza, H.: An Epidemiologic and Geographic Survey of Anaplasma marginale and Trypanosoma theileri in Colombia. Presented at the AVMA Convention, July, 1969, Minneapolis, Minnesota.

Kuttler, K. L. and Adams, L. G.: Comparative Efficacy of Oxytetracycline and a Dithiosemicarbazone in Eliminating Anaplasma marginale Infection in Splenectomized Calves. (Accepted for publication to Research in Veterinary Science).

Kuttler, K. L. and Zaraza, H.: A Preliminary Evaluation of a Dithiosemicarbazone for the Treatment of Anaplasmosis. (Accepted for publication to Research in Veterinary Science).

Kuttler, K. L.: Serial Passage of an Attenuated Anaplasma marginale in Splenectomized Calves. (Presented at the USAHA meeting October, 1969).

Kuttler, K. L. and Zaraza, H.: Premunization with an Attenuated Anaplasma marginale. (Presented at the USAHA meeting October, 1969).

Adams, L. G. and Kuttler, K. L.: Some Observations on the Toxicity of Alpha-Ethoxyethylglyoxal Dithiosemicarbazone in Cattle. (Manuscript prepared for publication).

Todorovic, R. A.: Babesiosis: A Monograph. (Manuscript prepared for publication).

Zaraza, H. and Kuttler, K. L.: Comparacion de los Colorantes de Naranja Acridina y Giemsa para el Diagnostico de Anaplasmosis. (Accepted for publication in ICA Journal).

Todorovic, R. A.: Babesiellosis Bovina. (Manuscript prepared for publication in Spanish)

Todorovic, R. A., Adams, L. G. and Roberts, E. D.: A Study of Bovine Babesiosis in Colombia, South America. (In Press). Reported

Adams, L. G., Hipolito, O., Marales, F. M., Gongora, S., and Jones, L. P.: Bovine Dermatophilosis in Colombia. (In Press)

Adams, L. G. and Ferreira, W.: Neo-Natal Ovine Necrobacillosis in Colombia. (In Press).

Adams, L. G. and Ferreira, W.: Procine Aflotoxicosis Due to Contaminated Peanut Meal. (In Preparation).

Adams, L. G., Roberts, E. D., Maner, J. M. and Gallo, J.: A Study of Lysinel and Tryptophan Deficient Diets and Their Relationship to Hepatic Lesions in Growing Swine. (In Preparation).

FRED D. MAURER

Educational Background: BS, 1934, University of Idaho, Moscow, Idaho; DVM, 1937, Washington State University, Pullman, Washington; PhD, 1948, Cornell University, Ithaca & NYC, New York; Virology, 1947-1948, Rockefeller Institute, NYC, New York. 1948, Diplomate American College of Veterinary Pathology.

Academic Appointment: Associate Dean, Professor of Pathology.

Previous Positions and Experience: 1951-1964, US Army Veterinary Corps with the following research and research administration assignments during that period; 1941-1943, Equine Research Laboratory; 1943-1946, Research on tropical diseases in Canada and Africa; 1946-1947 and 1948-1951, Chief veterinary virus research Walter Reed Army Institute of Research; 1951-1954, Leader tropical disease research team in Africa; 1954-1961, Chief Veterinary Pathology Division, Armed Forces Institute of Pathology; 1961-1964, Director of Medical Division, Fort Knox Medical Research Laboratory; 1964-Present, Associate Dean of the College of Veterinary Medicine and Director of the Institute of Tropical Veterinary Medicine, Texas A&M University.

Research Interest and Teaching Responsibility: The infectious diseases of food producing livestock with emphasis on the virology and pathology of exotic diseases.

Professional Organizations and Appointments: American College of Veterinary Pathologists (Councilor and Past President): American Veterinary Medical Association; Research Council (Past Chairman); Texas Veterinary Medical Association; US Animal Health Association (Past Chairman-Foreign Animal Disease Committee); Conference of Research Workers in Animal Diseases; American Association for Laboratory Animal Science; American Association of Equine Practitioners; Animal Health Committee, National Research Council; Primate Center Advisory Committee, NIH.

Selected Publications:

Chapters on African Swine Fever and Rinderpest in Viral and Rickettsial Infections of Animal. Edited by Betts and York: V. II, Academic Press. (In Press)

African Horse Sickness. 2nd edition of the USLS Assoc Book on Foreign Diseases, 1964.

Rinderpest. 2nd edition of the USLS Assoc Book on Foreign Diseases, 1964.

Lymphocytic Choriomeningitis. J. Lab. Ani. Care: V. 14 #5, 415-419, 1964.

Emerging Animal Diseases. Military Medicine: V. 128 #4, 327-333, 1963.

African Horse Sickness: With Emphasis on Pathology. Am. J. Vet. Res: V. 24, 235-266, 1963.

KENNETH L. KUTTLER: - (May 29, 1924 - Ft. Worth, Texas)

Educational Background: DVM, 1945, Colorado State College; MS, 1955, New York State University; PhD, 1965, University of East Africa.

Academic Appointment: Professor

Previous Positions and Experience: 1945-1946, Private Practice; 1949-1953, Captain, Army (VC); 1953-1955, Research Veterinarian, USDA; 1955-1963, Chairman, U. of Nevada, Department of Veterinary Science; 1963-1965, Research Veterinarian, Rockefeller Foundation; 1965-Present, Professor and Associate Director of Institute of Tropical Veterinary Medicine, Texas A&M University.

Research Interest and Teaching Responsibilities: Hemoprotozoan diseases directed toward their control. Currently working on anaplasmosis, babesiosis and Theileria.

Professional Organizations and Appointments: American Veterinary Medical Association, Texas Veterinary Medical Association, The Wildlife Society, Wildlife Diseases Association, Conference of Research Workers in Animal Diseases, United States Animal Health Association.

Selected Publications:

The Detection of Specific Complement-Fixing Antibodies in Serum of White-Tailed Deer (Odocoileus virginianus) with Theileria Infection. Canad. J. of Comp. Med. and Vet. Sci., 31 No. 12 (December, 1967), 453.

Exacerbation of Latent Erythrocytic Infections in Deer Following Splenectomy. Canad. J. of Comp. Med. and Veterinary Sci., 31 (December, 1967), 317.

Serological Response to Anaplasma marginale Infection in Splenectomized Deer (Odocoileus virginianus) as Measured by the Complement-Fixation and Capillary Tube Agglutination Tests. Proceedings of the 5th National Anaplasmosis Conference. February 28-29, 1968. Stillwater, Oklahoma.

Hematologic and Clinical Response to Anaplasmosis Vaccines and the Comparative Efficacy of these Vaccines, as Measured by Field and Experimental Challenge. Proceedings of the 5th National Anaplasmosis Conference. February 28-29, 1968. Stillwater, Oklahoma.

Blood Parasites in Texas Deer. (1968) For Publication.

Efectos de la Descarga Natural de Anaplasma marginale en Terneros Vacunados y no Vacunados. (Accepted for Publication in ICA Journal) 1968.

Respuesta Hematologica y Clinica a Diferentes Vacunas de Anaplasmosis y la Eficacia Comparative de estas, Evaluadas por la Inoculacion Experimental. (Accepted for Publication in ICA Journal) 1968.

LESLIE GARRY ADAMS - (August 17, 1941 - Brownwood, Texas)

Educational Background: A.Sc., 1961, Tarleton State College; 1963, B.Sc., Texas A&M University; 1964, DVM, Texas A&M University: 1968, PhD, Texas A&M University.

Academic Appointment: Assistant Professor, (Feb. 1968); and Head of the Research Group in Colombia

Research Interest and Teaching Responsibility: Basically interested in animal pathology with special interests in hemoprotozoan diseases, liver pathology and pathologic diagnosis. Has taught general and special pathology to American and Colombian students.

Professional Organizations and Appointments: American Veterinary Medical Association, American Association for the Advancement of Science, Phi Zeta, Phi Kappa Phi, Gamma Sigma Delta.

Selected Publications:

Cystitis Syndrome in Horses. Proc. 11th Ann. Conf. Amer. Assn. of Eq. Practitioners, (Dec., 1965): 65-69.

The Equine Cystitis Syndrome. Southwest. Vet., 19 (Winter, 1966): 95-99.

A Disease of the Horse Characterized by Cystitis and Ataxia. (In Press).

A Morphological and Biochemical Study of the Pathogenesis of Ovine Hepatic Fatty Cirrhosis. (May, 1968): Dissertation.

Ovine Hepatic Fatty Cirrhosis. I Epizootiology and Clinical Manifestations. In Preparation.

Ovine Hepatic Fatty Cirrhosis. II Morphological Pathology. In Preparation.

Ovine Hepatic Fatty Cirrhosis. III Biochemical Alterations. In Preparation.

Ovine Hepatic Fatty Cirrhosis. IV Electron Microscopy. In Preparation.

Observations on the Toxicity of alpha-Ethoxyethylglyoxal Dithiosemicarbazone in Cattle. In Preparation.

Dermatophilosis of Cattle in Cordoba, Colombia. In Preparation.

Procine Aflatoxicosis in Cundinamarca, Colombia. In Preparation.

Necrobacillosis in Neo-natal Lambs in Cundinamarca, Colombia. In Preparation.

An Epizootiologic and Geographic Survey of *Anaplasma marginale* and *Trypanosoma theileri* in Colombia. (In Press).

A Study of Bovine Babesiosis in Colombia, South America. (In Press).

RADMILO A. TODOROVIC - (October 30, 1927 - Zabojnica, Yugoslavia)

Educational Background: DVM, 1953, University of Belgrade; MS, 1963, University of Wisconsin, PhD, 1967, University of Illinois.

Academic Appointment: Associate Professor (1968-Present); Research Group in Colombia.

Previous Positions and Experience: 1967-1968, Research Associate, University of Illinois; 1964-1967, NIH Post-Doctoral Fellow, University of Illinois; 1961-1963, Project Assistant, University Wisconsin; 1960-1964, Research Veterinarian, American Breeders Service; 1955-1960, Assistant Professor, University of Belgrade; 1968-Present, Associate Professor, Texas A&M University (Research Group in Colombia).

Research Interest and Teaching Responsibility: Hemoprotozoan diseases with emphasis upon the development of diagnostic tests and vaccines for their control. Currently working upon methods for the control of bovine babesiosis and in the training of graduate students who are working with him.

Professional Organizations and Appointments: American Veterinary Medical Association, Society of Protozoologists, Illinois Society for Medical Research, American Association for Advancement of Science, American Association of University Professors, Conference of Research Work in Animal Diseases, Phi Zeta, Phi Sigma, Sigma Xi.

Selected Publications:

Significance and Application of Babesial and Malarial Exo-antigens to Comparative Medicine. Proc. 105th Annual Meeting American Veterinary Medical Association. Boston, Mass.

Antigens of *Plasmodium gallinaceum*. I. Biophysical and Biochemical Characterization of Explasmodial Antigens. Am. Journal of Tropical Medicine and Hygiene, 17: 688-694.

Antigens of Plasmodium gallinaceum. II. Immunoserologic Characterization of Explasmodial Antigens. Am. Journal of Tropical Medicine and Hygiene, 17: 695-701.

Plasmodial Exo-antigens. Proc. VIII International Congress on Tropical Medicine and Malaria. September 7-15, Teheran.

Aging Phenomena in Spermatozoa. IV. Immunoserologic Characteristics of the DNA-protein Extracted from Fresh and Aged Bovine Spermatozoa. J. Reproduct. Fertility (In Press).

Babesiellosis Bovina en Australia. (In Press).

A Study of Babesiosis in Colombia, S. America. AVMA Res. J. (In Press).

RUREL R. BELL: - (May 11, 1924 - Gibson, Georgia)

Educational Background: DVM, 1952, University of Georgia; MS, 1955, Texas A&M University; PhD, 1968, University of Minnesota.

Academic Appointment: Professor and Head of Department of Parasitology.

Previous Positions and Experience: 1952-1955, Instructor, Assistant Professor, Texas A&M University; 1955-1956, Associate Professor, North Carolina State University; 1956-Present, Associate Professor, Professor, Head, Texas A&M University.

Research Interest and Teaching Responsibilities: Internal Parasites of Ruminants with particular interest on trematodes. Veterinary Parasitology 483 and 484.

Professional Organizations and Appointments: Animal Disease Research Workers of Southern States (Director), American Association of Veterinary Parasitologists, Brazos Valley Veterinary Medical Association, Texas Veterinary Medical Association, American Veterinary Medical Association, Sigma Xi, Alpha Zeta, Phi Eta Sigma, Phi Kappa Phi.

Selected Publications:

A Survey of the Gastrointestinal Parasites of Cattle in North Carolina. Am. J. Res., 18, (1957): 292-294.

Incidence of Certain Gastrointestinal Parasites of Cattle in Texas. Am. J. Vet. Res., 20, (1959): 766-767.

Survival on Pasture of Infective Larvae of Cooperia pectinata and Ostertagia ostertagi. Am. J. Vet. Res., 21, (1960): 1101-1103.

Anthelmintics for Ruminants I. Studies on the Toxicity and Efficacy of Bayer 21/199 as an Anthelmintic. Am. J. Vet. Res., 21, (1960): 1054-1057.

Anthelmintics for Ruminants II. Anthelmintic Activity and Toxicity of Ruelene in Sheep. Am. J. Vet. Res., 21, (1960): 1058-1061.

Anthelmintics for Ruminants III. Dithiazanine Iodide and Bephenium Embonate. Southwest. Vet., 13, (1960): 197-202.

Anthelmintics for Ruminants IV. Further Studies on Ruelene in Sheep. Am. J. Vet. Res., 23, (1962): 185-190.

Anthelmintics for Ruminants V. The Organic Phosphorus Compounds, Bayer L 13/59 and Bayer 22/408. Am. J. Vet. Res., 23, (1962): 191-194.

Anthelmintics for Ruminants VI. Thiabendazole. Am. J. Vet. Res., 23, (1962): 195-200.

LELAND C. GRUMBLES: - (September 21, 1921 - Star City, Arkansas)

Educational Background: DVM, 1945, Texas A&M University; MS, 1957, Texas A&M University.

Academic Appointment: Professor and Head of Department of Microbiology.

Previous Positions and Experience: 1945-1946, Mixed Practice: 1947-1948, Assistant Professor, Rhode Island State College; 1948-1949, Assistant Professor, Louisiana State University; 1949-1953, Associate Professor, Texas A&M, 1953-1955, Captain, USAF (VC); 1955-1957, Associate Professor, Texas A&M; 1957-Present, Professor and Head, Texas A&M.

Research Interest and Teaching Responsibilities: The diagnosis and control c infectious diseases by laboratory methods. Head of the Department of Micro biology with responsibilities for diagnosis, research and teaching of both pro fessional and graduate students.

Professional Organizations and Appointments: Texas Veterinary Medical Ass ciation, American Veterinary Medical Association (Sect. & Chairman Poultry Section), Animal Disease Research Workers of Southern States (President), American Association of Avian Pathologists (Interim Chairman during organi zation) American College of Veterinary Microbiologists (Vice President - Board of Governors), U.S. Livestock Sanitary Association, Conference of Veterinary Laboratory Diagnosticians, Phi Kappa Phi (Secretary and President), Sigma Xi, Phi Zeta.

Selected Publications:

Eradication of Infectious Sinusitis in a Texas Hatchery Operation by Serological Testing. Avian Diseases, 5, (1961): 168-177.

Pathological Serologic, and Cultural Characteristics of Ten Avian Strains of PPLO. Proceedings of the New Academy of Science. (1959): 556-561.

Characteristics of Avian Mycoplasma (PPLO) in Tissue Culture of Human and Avian Cells. Avian Diseases 1964 (2): 274-279.

Agglutination Antigen From an Ornithosis Agent. I. Preparation Method and Tests with Turkey Serums. Avian Diseases 10: 342-347, 1966.

Hemagglutination Activity, Embryo Pathogenicity and Intracerebral Pathogenicity of Three Strains of Newcastle Disease Virus Following Adsorption on Chicken Brain Cells. Avain Diseases 10: 273-281, 1966.

Bovine Papular Stomatitis: Experimental Transmission from Man. Amer. J. Vet. Res. 29: 1783-1790, 1968.

Effect of Lysogenicity on the Virulence of Bacillus anthracis. Amer. J. Vet. Res. 29: 1059-1066, 1968.

CHARLES HUBERT BRIDGES - (February 23, 1921 - Shreveport, Louisiana)

Educational Background: DVM, 1945, Texas A&M University; MS, 1954, Texas A&M University; PhD, 1957, Texas A&M University; 1956, Diplomate, American College of Veterinary Pathologists; 1955, Certificate, Fellow in Pathology AFIP.

Academic Appointment: Professor and Head of Department of Veterinary Pathology.

Previous Positions and Experience: 1945-1949, General Practice; 1949-1951, Research Associate and Instructor, Louisiana State University; 1951-1953, Major USAF (Res.) Base Veterinarian, USAF Veterinary Service; 1954-1955, Fellow in Pathology, Armed Forces Institute of Pathology; 1955-1959, Associate Professor, Texas A&M University; 1959-1960, Professor, Texas A&M University; 1960-Present, Professor and Head of Department, Texas A&M University.

Research Interest and Teaching Responsibilities: Comparative Pathology, Infectious Diseases, and Neuropathology. Teaches Systemic Pathology 641.

Professional Organizations and Appointments: American College of Veterinary Pathologists (Chairman of Committee on Education, 1965), Conference of Research workers in Animal Disease (Section Chairman, 1967-1968). American Veterinary Medical Association, International Academy of Pathology, Texas Society for Electronmicroscopy. Society for Human and Animal Mycology, Phi Zeta, Sigma Xi, Phi Kappa Phi, Medical Mycological Society of the Americas.

Selected Publications:

Mycotic Diseases in Mammalian Reproduction. In Comparative Aspects of Reproductive Failure. Edited by Kurt Benirschke. Springer-Verlag New York, Inc., New York, N.Y. (1967): 322-332.

Cerebrospinal Lipodystrophy in Swine. A New Disease Model in Comparative Pathology. Path. Vet. 5 (1968): 67-74.

Neuromuscular Effects of Carbaryl Insecticide in Swine. Toxicology and Applied Pharmacology. 14 (1969): 409.

Dermatological Conditions in Equidae, Proceedings of the Ninth Annual American Association of Equine Practitioners Convention, Lexington, Kentucky. 147-160 (1968).

Cerebrospinal Lipodystrophy in Swine. A New Disease Model in Comparative Pathology. Path. Vet. 5 (1968): 67-74.

Cystitis and Ataxia Associated with Sorghum Ingestion by Horses, JAVMA (Sept. 1969).

Neuronal Lipodystrophy Occurrence in an Inbred Strain of Cattle. Path. Vet. 6 (1969): 235-243.

MARK F. YOUNG: - (August 23, 1933 - Lehi, Utah)

Educational Background: BS, 1955, Utah State University; DVM, 1958, Iowa State University; MS, 1964, Texas A&M University.

Academic Appointment: Associate Professor.

Previous Positions and Experience: 1959-1960, Instructor, Iowa State University; 1960-1962, Instructor, Texas A&M University; 1962-1968, Assistant Professor, Texas A&M University; 1968-Present, Associate Professor, Texas A&M University.

Research Interest and Teaching Responsibilities: Interest in research on the clinical aspects of cattle and swine diseases. Teaching clinics, clinical medicine, and diseases of large animals.

Professional Organizations and Appointments: Texas Veterinary Medical Association, American Veterinary Medical Association, American Association of the Veterinary Clinitions, Brazos Valley Veterinary Medical Association.

Selected Publications:

Edema Disease of Swine. Southwestern Veterinarian, Vol. XV No. 3, (1962): 235-236.

The Serum Transaminase Activities of Equs Caballus, A Study of the Transaminase Levels Under Normal and Disease Conditions, M.S. Thesis (1964).

RICHARD ANDREW DENNIS: - (October 11, 1940 - Saint Jo, Texas)

Educational Background: BS, 1963, Texas A&M University; 1964, DVM, Texas A&M University; 1968, MS, Ohio State University; 1968, PhD, Ohio State University.

Academic Appointment: Assistant Professor

Research Interest and Teaching Responsibilities: Immunopathology of infectious diseases. Currently working on an acute immunohemolytic anemia of calves which may prove to have resulted from erythrocyte antigens in a commercial anaplasmosis vaccine. Teaches Pathological Techniques and trains graduate students in immunopathology.

Professional Organizations and Appointments: American Veterinary Medical Association, Texas Veterinary Medical Association.

Selected Publications:

Storts, R.W., Koestner, A. and Dennis, R.A.: The Effects of Canine Distemper Virus of Explant Tissue Cultures of Canine Cerebellum. Acta Neuropath (1968) 11: 1-14.

Intrauterine Techniques for Studying Development of the Immune Response of the Fetal Dog. (In Publication)

Development of Immunity in Fetal Dogs. II. Skin Allograft Survival. (In Publication)

Development of Immunity in Fetal Dogs. III. Effects of Thymectomy. (In Publication)

Development of Immunity in Fetal Dogs. I. Humoral Responses. (In Publication)

THOMAS JOSEPH GALVIN: - (March 14, 1934 - Cisco, Texas)

Educational Background: DVM, 1957, Texas A&M University; MS, 1961, Texas A&M University; BS, 1961, Texas A&M University; PhD, 1964, Tulane University.

Previous Positions and Experience: 1957-1958, Station Veterinarian, North Carolina State College; 1958-Present Instructor-Associate Professor, Texas A&M University; 1965-1967, Assoc. Professor, Colorado State University.

Research Interest and Teaching Responsibilities: Conducting a survey by cultural methods for the presence and distribution of *Trypanosoma theileri* in Texas cattle.

Professional Organizations and Appointments: Phi Zeta, Sigma Xi, American Veterinary Medical Association, Texas Veterinary Medical Association, Brazos Valley Veterinary Medical Association, American Society of Parasitologists, American Society of Tropical Medicine & Hygiene, World Association of Advanced Veterinary Parasitology, American Association of Veterinary Parasitologist, Gamma Sigma Delta, New York Academy of Sciences, Southwestern Association of Parasitologists.

Selected Publications:

Galvin, T. J., Turk, R. D., and Bell, R. R.: Anthelmintics for Ruminants I. Studies on the Toxicity and Efficacy of Bayer 21/199 as an Anthelmintic. Amer. J. Vet. Res. (21): 1054-1057, 1960.

Galvin, T. J., Bell, R. R., and Turk, R. D.: Anthelmintics for Ruminants II. Anthelmintic Activity and Toxicity of Ruelene in Sheep. Amer. J. Vet. Res. (21): 1058-1061, 1960.

Galvin, T. J., Bell, R. R., and Turk, R. D.: Anthelmintics for Ruminants III. Dithiazanine Iodide and Bephenium Embonate. Southwest. Vet. (13): 197-202, 1961.

Galvin, T. J., Turk, R. D., and Bell, R. R.: Anthelmintics for Ruminants IV. Further Studies on Ruelene in Sheep. Amer. J. Vet. Res. (23): 185-190.

Galvin, T. J., and Turk, R. D.: Intestinal Parasitism. Current Vet. Therapy, Small Animal Practice: 190-194, 1966-1967.

Galvin, T. J.: Development of Human and Pig Ascaris in the Pig and Rabbit. J. Parasit. (54): 1085-1091, 1968.

Turk, R. D., Galvin, T. J., and Bell, R. R.: Comparative Tests of the Anthelmintics Haloxon, Phenothiazine and Thiabendazole in Sheep and Goats. Southwest. Vet. (19): 44-48, 1965.

RICHARD J. HIDALGO: - (June 4, 1938 - Opelousas, Louisiana)

Educational Background: DVM, 1962, Texas A&M University; MS, 1964, Louisiana State University; PhD, 1966, Louisiana State University.

Academic Appointment: Associate Professor

Previous Positions and Experience: 1962-1966, NIH Fellow, Department of Veterinary Science, Louisiana State University; 1966-1969, Assistant Professor, Texas A&M University; 1969, Associate Professor, Texas A&M University.

Research Interest and Teaching Responsibilities: Research interests deal primarily with infectious diseases of the bovine, particularly anaplasmosis and the bovine respiratory disease complex. Responsibilities include teaching of pathogenic bacteriology to graduate and undergraduate students.

Professional Organizations and Appointments: American Veterinary Medical Association, Texas Veterinary Medical Association, Brazos Valley Veterinary Medical Association, American Society for Microbiology, American College of Veterinary Microbiologists (Diplomate), Texas Branch of American Society for Microbiology, Conference of Veterinary Laboratory Diagnosticians, United States Animal Health Association, Phi Zeta, Sigma Xi, Phi Kappa Phi, Gamma Sigma Delta.

Selected Publications:

Rogers, T. E., Hidalgo, R. J. and Dimopoullos, G. T.: Immunology and Serology of Anaplasma marginale. I. Fractionation of the Complement-Fixing Antigen. J. Bact. 88 (1964): 81-86.

Hidalgo, R. J.: Serologic Studies on Anaplasmosis. I. The Development of a Micro Complement Fixation Test for Diagnosis. II. The Effect of Preservatives on Sera to be Tested for Anaplasmosis, M. S. Thesis, Louisiana State University.

Hidalgo, R. J.: Characterization of the Lipids of Three Serotypes of Leptospira, PhD Dissertation, Louisiana State University, 1966.

Hidalgo, R. J.: Characterization of the Lipids of Three Serotypes of Leptospira, PhD. Dissertation, Louisiana State University, 1966.

Hidalgo, R. J. and Dimopoullos, G. T.: Complement-Fixation Microprocedures for Anaplasmosis. American Journal of Veterinary Research, 28 (122): 245-251, 1967.

Hidalgo, R. J. and Dimopoullos, G. T.: Preservation of Serums to be Tested for Anaplasmosis by the Complement-Fixation Test. American Journal of Veterinary Research, 28 (122): 253-258, 1967.

JAMES E. GRIMES: - (March 29, 1925 - Fort Worth, Texas)

Educational Background: AA, 1948, Clifton Junior College; BA, 1950, Texas Lutheran College; MA, 1959, University of Texas at Austin; PhD, 1967, Texas A&M University.

Academic Appointment: Assistant Professor

Previous Positions and Experience: 1956, Secretary, Laboratory Section, Texas Public Health Association; 1957, Chairman, Laboratory Section, Texas Public Health Association; 1967-Present, Assistant Professor, Texas A&M University.

Research Interest and Teaching Repsonsibilities: Research on anaplasmosis and babesiosis with emphasis upon the preparation and evaluation of antigens which are vital for serologic testing and vaccine development.

Professional Organizations and Appointments: Texas Branch, American Society for Microbiology.

Selected Publications:

Grimes, J. E., Grumbles, L. C., and Moore, R. W.: Complement fixation and hemagglutination antigens from an ornithosis (chlamydial) agent grown in cell culture. (In Manuscript)

Grimes, J. E., Moore, R. W., and Grumbles, L. C.: Agglutinating antigen from an ornithosis agent. II Modification of antigen preparation and test procedure. Avian Dis. (13): 345-355, 1969.

Grimes, J. E., Moore, R. W., and Grumbles, L. C.: Agglutinating antigen from an ornithosis agent. I. Preparation method and tests with turkey serums. Avian Dis., (10): 342-347, 1966.

Grimes, J. E., Sullivan, Thelma D., and Irons, J. V.: Recovery of Ornithosis Agent from Naturally Infected White-Winged Doves. J. Wldl. Mgmt., (30): 594-598, 1966.

Wiseman, J. S., Davis, B. L., and Grimes, J. E.: Rabies Infection in the Red Bat, Lasiurus borealis borealis (Muller), in Texas. J. Mammal (43): 279-280, 1962.

Irons, J. V., Eads, R. B., Grimes, J. E., and Sullivan, Thelam D.: Investigacion sobre la encefalitis en Texas. Bol. of San. Panam., (48): 61-63, 1960.

Wiseman, J. S., Grimes, J.E., and Eads, R. B.: St. Louis Encephalitis Outbreak in Cameron County, Texas. Mosq. News (19): 3-7, 1959.

PROGRESS REPORT OF RESEARCH
February 1970

The establishment of the Institute of Tropical Veterinary Medicine at Texas A&M University in January, 1967, and its subsequent support by the Rockefeller Foundation and the Agency for International Development, has put in motion plans to develop greater competency, and understanding of animal disease problems in the tropics.

The professional staff has increased during the past 2 years from a single full time employee to 3 staff positions, not including the Institute Director who also serves as Associate Dean for Research in the College of Veterinary Medicine. In addition there are 4 Master of Science and one Doctor of Philosophy candidates actively purusing studies of tropical veterinary medicine in the discipline of their choice.

The arthropod born hemotropic diseases were initially chosen as a major area of study in recognition of the critical need for information and techniques for the control of these diseases in the tropics. The Institute's research program began in July, 1967, at Bogota, Colombia as a cooperative effort with the Instituto Colombiano Agropecuario (ICA). In December, 1968, following an increase in staff, a research program was started on the Texas A&M campus. Presently, research is actively underway at both locations. In 1969 Texas A&M staff members at Bogota became affiliated with CIAT, recently established and based at Cali, Colombia.

Research conducted on anaplasmosis, babesiosis, and to a lesser degree trypanosomiasis has resulted in numerous scientific publications. Of greater significance and interest to the livestock producer in the tropics

have been the development of techniques which should form the basis of future control programs. These findings have not been developed without setbacks, and reversals, but a method is taking shape which when implemented should dramatically reduce losses from anaplasmosis and babesiosis. These techniques while proving useful, should realistically be considered a first step toward eventual complete control.

A limited survey of cattle herds located in various climatic and geographic zones of Colombia revealed that anaplasmosis was endemic in those areas where the altitude was 4,000 feet or less. At 8,000 ft. and above the disease was not found except in animals having been brought into the area. The incidence and severity of anaplasmosis increased as the altitude decreased. This correlation between altitude and disease incidence would probably apply to other tropical countries if an adjustment is made for latitude.

The problems of anaplasmosis and babesiosis were found to be most severe at the ICA station (Turipana) near Monteria on the north coast of Colombia. For this reason Turipana was chosen as the location of field trials attempting to suppress the often devastating effects of anaplasmosis and babesiosis in introduced cattle. A live vaccine using an attenuated *A. marginale* strain and a killed vaccine, both developed in the U.S., were unsuccessful in producing the desired protection in calves being moved to Turipana. Under less severe conditions, particularly in the U.S., these

vaccines have been shown to be of value.

A method of premunization using virulent organisms proved successful. On two occasions experiments consisting of the intentional infection of susceptible calves with fully virulent Anaplasma produced solidly immune animals. The experimental infection was moderated by the use of drugs given at the proper time. Both the oxytetracyclines and a new experimental drug designated 356C61 (a dithiosemicarbazone developed by Burroughs Wellcome Laboratories) are useful.

A similar premunizing infection with Babesia proved nearly as successful. In this instance 35% of the ono-premunized control calves died and all became acutely ill requiring treatment. The premunized calves on the other hand were slower in developing evidence of babesiosis and when it did occur were much less severely affected. None of the vaccinated calves died of babesiosis. It has been found that babesiosis due to a virulent Babesia can be successfully controlled with either Ganaseg, or a new experimental drug designated 4A65 (Burroughs Wellcome Laboratories).

These experimental trials will provide the basis of a control program soon to be tried in Colombia. Even though it is anticipated that these protective measures will improve control, safer and more effective measures are called for.

Recent experimental results have contributed significantly to our

understanding of these diseases and by so doing are providing the basis on which more effective control programs can be implemented for the future. A few of the more significant findings are listed:

1) The drug 4A65 has shown marked prophylactic value against Babesia for up to 46 days after treatment.
2) Killed adjuvant vaccines against both anaplasmosis and babesiosis have been prepared, and are being tried. Vaccines against babesiosis show promise.
3) Sterile immunity has resulted in mice following a B. rodhaini infection and treatment. A follow-up on this finding might lead to a new approach to immunity to babesiosis.
4) Drug trials with 4A65 have shown it superior to Ganaseg in the suppression of B. rodhaini, in mice but somewhat toxic to calves at 3mg/kg level when used against B. bigemina.
5) A complement-fixing antigen has been prepared from Babesia infected bovine blood forming the basis of a successful serologic test for the detection of babesiosis.
6) Other Babesia serological tests such as double gel diffusion, immunoelectrophoresis, and latex particle

agglutination have been developed which offer greater sensitivity and a greater potential for the eventual recognition of serologic types and sub-types.

7) Transmission studies have been made with the tick Boophilus annulatus. B. annulatus transmits both anaplasmosis and babesiosis to cattle. Transmission of anaplasmosis and babesiosis by B. annulatus to white tailed deer (Odocoileus virginianus) did not occur.

8) Detailed studies of the biochemic and pathologic changes associated with anaplasmosis, babesiosis, and trypanosomiasis, have been or will be made. These studies while very basic in nature have never been conducted in the depth planned.

9) The drug 356C61 while highly effective in removing A. marginale parasitemia, has not been shown capable of entirely removing the infection at sub-toxic levels.

10) Efforts to experimentally adapt A. marginale to goats have been unsuccessful. Attempts to establish a non-bovine model are now being made with sheep.

11) Research with T. vivax and T. theileri have been confined mainly to distribution and pathogenesis studies. T. theileri has been found in both Colombia and Texas.

The following hemotropic pathogens are being maintained by the Institute staff, at Texas and Colombia.

Anaplasma marginale (Texas virulent)

A. marginale (Llanos strain)

A. marginale (Attenuated strain)

Babesia bigemina (bovine)

B. argentina (bovine)

B. major (bovine)

B. rodhaini (mice)

B. cervi (deer)

Trypanosoma theileri (bovine)

T. vivax (bovine)

Theileria cervi (deer)

The many and varied facets of research results on the hemotropic diseases are constantly adding to our knowledge and filling in the voids concerning our understanding of these complex and costly diseases. An integral part of our program is the field application of these findings which will hopefully lead to a practical, and effective control approach to these disease problems in the tropics.