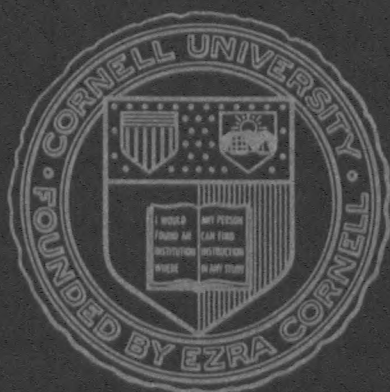


THE INSTITUTE REPORT



From the
VETERINARY VIRUS RESEARCH INSTITUTE
Cornell University, Ithaca, New York

September, 1974

Volume 24

THE INSTITUTE REPORT



From the
CORNELL RESEARCH LABORATORY
FOR DISEASES OF DOGS

Cornell University, Ithaca, New York

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VETERINARY COLLEGE

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MESSAGE FROM THE DIRECTOR

OUR 24th Annual Report has been prepared to give a brief but complete report of progress made during the past year to those whose support makes possible the work of the Cornell Research Laboratory for Diseases of Dogs.

The Research Program: In the past year, research activities by the staff of the Cornell Research Laboratory for Diseases of Dogs have focused on 29 projects. This work has produced 13 publications. Essentially, the projects cover viral, bacterial, physiological, clinical, nutritional, and biochemical studies. Titles of projects are listed alphabetically by name of the research leader.

Measles Vaccine Protection Against Distemper. J. A. Baker and J. Joubert

Effects of Radiation on the Immune Response to Canine Distemper Vaccine. J. A. Baker and J. Joubert

Protein and Amino Acid Requirements of Dogs. Effect of Diet on Blood Amino Acid Levels in the Dog. C. A. Banta, M. M. Krinsky, and B. E. Sheffy

Protein and Amino Acid Requirements of Dogs. Effect of Quality and Quantity of Protein on the Plasma Amino Acid Profile in Growing Dogs. C. A. Banta

Gastrointestinal Function in the Dog. C. A. Banta, E. T. Clemens, M. M. Krinsky, and B. E. Sheffy

Bordetella bronchiseptica: Its Relative Pathogenicity and Effects on Canine Respiratory Disease. D. A. Bemis

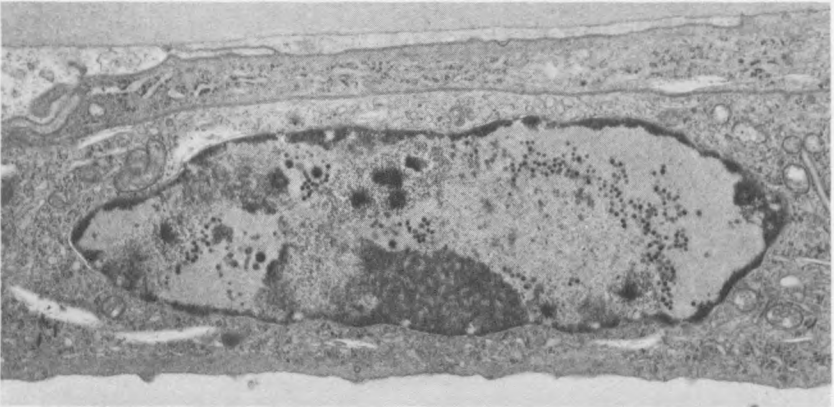
Bordetella bronchiseptica: An Electron Microscopic Study. D. A. Bemis and H. A. Wiltberger

Canine Adenovirus-1 (ICH): Immunopathogenesis of Eye Lesions.

L. E. Carmichael



Normal corneal endothelial cell in the eye of a dog.



Corneal endothelial cell from the eye of a dog infected with canine adenovirus type 1 vaccine virus. Small dots are virus particles within the cell nucleus.

Canine Herpesvirus: Viral Persistence Studies. L. E. Carmichael

Canine Brucellosis: Serological Survey in Memphis, Tennessee. L. E. Carmichael
in cooperation with G. S. Lovejoy, M.D. and R. S. Munford, M.D.

Effect of Antithymocyte Serum on Pathogenesis of Canine Herpesvirus.

L. E. Carmichael and B. S. Medic

Temperature and Cell-Mediated Immunity (CMI) in the Dog. L. E. Carmichael,
R. D. Schultz, and B. S. Medic

Attenuation of Canine Herpesvirus. L. E. Carmichael and B. S. Medic

Canine Oral Papillomas. L. E. Carmichael and H. A. Wiltberger

*Development of a Plate Agglutination Test for the Rapid Diagnosis of B. canis
Infection.* L. George and L. E. Carmichael

Studies on Male Infertility Caused by B. canis. L. George, J. R. Duncan, and L. E. Carmichael

Proteoglycan and Collagen Metabolism in Normal Articular Cartilage and in Degenerative (Osteoarthritic) Articular Cartilage. G. Lust, D. R. Miller, and P. L. Ferrante

In vitro Culture of Canine Articular Chondrocytes from Normal and Osteoarthritic Canine Cartilage. G. Lust and P. L. Ferrante

Canine Hip Dysplasia. G. Lust, J. C. Geary, W. J. Roenigk, and B. E. Sheffy

Canine Distemper, Measles, and the Immune Response. R. D. Schultz

Cell-Mediated Immunity in the Dog - In vitro Correlates of CMI. R. D. Schultz, L. S. Adams, and L. E. Carmichael

Aberration of the Immune Response in Canine Demodicosis. R. D. Schultz, B. Farrow, and D. Scott

Radioimmunoassay Procedure for Antibody to Bacterial Antigens. E. Bloch and R. D. Schultz

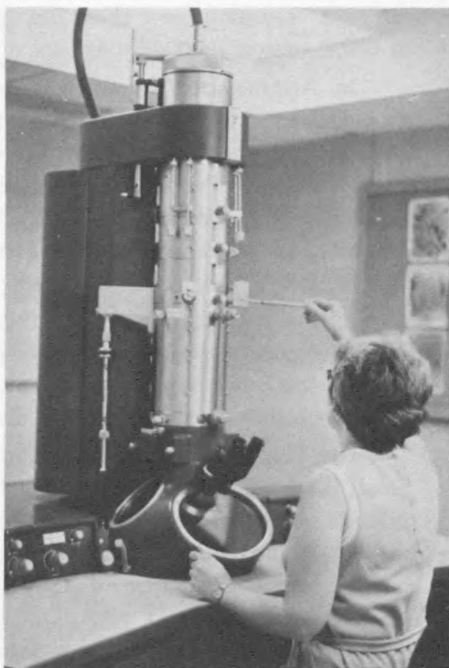
Re-evaluation of Trace Element Requirements of Dogs. B. E. Sheffy, M. M. Krinsky, A. J. Williams, and C. A. Banta

Effect of Vitamin C on Host Response to Infectious Disease. B. E. Sheffy, M. M. Krinsky, and A. J. Williams

Chronic Vitamin D Toxicity in Dogs. B. E. Sheffy, A. J. Williams, L. T. Pulley, J. Bentinck-Smith



Lincoln Adams preparing lymphocytes with an automated cell harvester to measure cell-mediated immunity in dogs.



Dr. Helen Wiltberger placing a sample in the electron microscope to study the nature of cell-virus relationship.

Carbohydrate Requirements of Dogs. B. E. Sheffy, M. M. Krinsky, A. J. Williams, and C. A. Banta

Nutritional Adequacy of Fortified All-Meat and Commercial Dry Dog Food. B. E. Sheffy, A. J. Williams, M. M. Krinsky, J. C. Hardy, and C. A. Banta

An Ultrastructural Investigation of Canine Articular Cartilage: Comparison of Normal and Degenerative Samples from Hip Joints. H. A. Wiltberger and G. Lust

As you review the staff listing, you will note that we have enlarged the staff which has permitted not only more projects but diversification of projects. This has been made possible by the tremendous response of our supporters who are interested in more knowledge to improve the health of dogs.

Education: In preparing Laboratory Report No. 4, "Neonatal Puppy Mortality," we have responded to the desire of people to have more knowledge. This report was received with great interest as indicated by the expressions of appreciation from all over the country. This is very encouraging to us to prepare additional laboratory reports. Laboratory Report No. 5 is in preparation and in it we shall discuss current knowledge of the immune response. Learning more about the immune response will enable dog owners to better protect their dogs against disease.

In Appreciation: For their exceptional interest in the Institute, we should like to express appreciation to the following: Mrs. Boyce Bailes, Mrs. Mona Berger, Dr. Louis A. Corwin, Sr., Mr. and Mrs. Gaylord Donnelly, Miss Gladys Freeman, Dr. Kenneth I. Gumaer, Mr. and Mrs. E. Roland Harriman, Mrs. Dorothy B. Howe, Dr. John J. Huckle, Mr. and Mrs. John Lafore, Mr. James A. Moffett, Mrs. Ann W. Olin, Mr. John M. Olin, Mr. Spencer T. Olin, Mrs. Vincent F. Wilcox, and Mr. Robert W. Woodruff.

In the past year, more veterinarians have become Research Partners. This continued response has been of great value in helping the research program of the Laboratory. More and more dog clubs are giving greater support, making possible an expanded and diversified research program.

Dr. Hadley C. Stephenson, Professor of Veterinary Therapeutics and Small Animal Diseases, Emeritus, at Cornell, has been a member of the staff of the Cornell Research Laboratory for Diseases of Dogs since his retirement in 1953 from fulltime teaching and research responsibilities. A research laboratory for the study of canine diseases was dedicated in honor of Dr. Stephenson. For 21 years, Dr. Stephenson has been instrumental in developing and maintaining a cooperative relationship between the Cornell Research Laboratory for Diseases of Dogs and its supporters. He has helped to promote better health for dogs through the dissemination of information developed by research of the Laboratory.

Financial Situation: In 1972-73 we failed to balance the budget, having a deficit of \$75,384. This year the financial situation improved substantially, and the deficit was reduced to \$16,825. Receipts from 1971-72 New York State dog license fees were made available to be utilized in 1973-74. This was an important factor in reducing the deficit. These funds also enabled the Laboratory to acquire several essential items of laboratory equipment.

Financial situation July 1, 1973-June 30, 1974

FUNDS AVAILABLE

Contributions and earnings budgeted	\$275,000.
State of New York general support	85,653.
State of New York dog license fees	147,294.
State of New York dog license fees (1971-72 receipts)	143,000.
Allen Products Company grant	47,700.
	<hr/>
	\$698,647.

EXPENDITURES

Salaries	\$442,589.
Operational costs	272,883.
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	\$715,472.
Reserves used to balance budget	\$ 16,825.

To assure donors of funds for research for dogs that their funds will support such research, currently or in the future, the Cornell University Board of Trustees made a provision for disposal of excess income as follows: "The Institute's income is in excess of its operating expense, and the balance of the funds is added to the Institute's Endowment."

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 BEN E. SHEFFY, B.S., M.S., Ph.D., Wisconsin. Caspary Professor of Nutrition and
 Assistant Director of the Institute

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 Veterinary Therapeutics and Small Animal Diseases.) Veterinary Consultant

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 KENNETH BONDIOLI, B.S., Cornell. Laboratory Technician
 CLARENCE CAPLE, Farmer
 BERNARD L. CLARK, Research Technician
 GERALD HILLER, Animal Technician
 LLOYD TOTMAN, Animal Technician

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 FRANK SEARS, Building Maintenance Supervisor
 MICHAEL VAUGHN, Maintenance Helper
 EDSON WHEELER, Senior Mechanician

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- PAMELA L. FERRANTE, B.A., University of New Hampshire. Laboratory
 Technician
 GEORGE LUST, B.S., University of Massachusetts; Ph.D., Cornell. Associate
 Professor of Biochemistry
 DOUGLAS R. MILLER, B.A., Washington and Jefferson College. Research
 Assistant

Brucellosis Laboratory (Operating funds provided by the American Kennel Club):

- LISLE GEORGE, B.S., Pennsylvania State University; D.V.M., Ph.D., Cornell.
 (Completed requirements for the Ph.D. degree June 30, 1974.)
 CHI-KUANG KING, B.E., National Taiwan Normal University; M.S.,
 Winthrop College. Laboratory Technician

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MARY M. KRINSKY, B.S., Iowa State University; M.Ph., Ph.D., Yale
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Laboratory Technician

DOUGLAS S. ROBSON, B.S., M.A., Iowa State University; Ph.D., Cornell.
Consultant in Statistics

ELIZABETH WHEELER, Laboratory Technician

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These doctors of veterinary medicine are contributing time and effort, without
compensation, in order to secure information for the control of infectious diseases.

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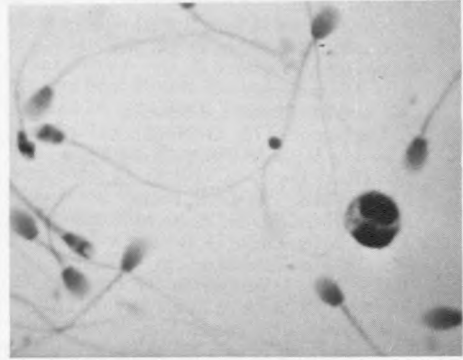
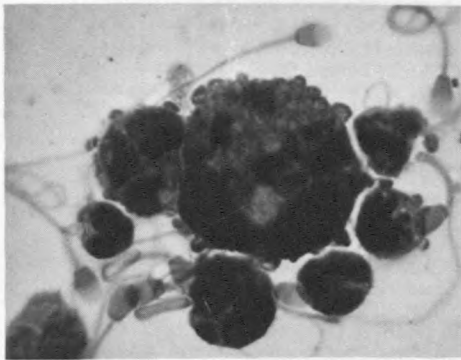
LEON YOUNG, D.V.M., Thomasville, Georgia

PUBLICATIONS FROM THE VETERINARY VIRUS
RESEARCH INSTITUTE

Publications for the first ten years were listed in the Institute Report for 1960. Those for each following year were listed in its annual report. Since 1960, articles have been numbered consecutively. Some of the following numbers were listed in previous years' reports as "accepted" or "in press." They are repeated this year, with their original numbers, to record the volume and page references. Articles numbered 304-316 were completed during the past year.

- (289) AGUIRRE, G. D., CARMICHAEL, L. E., and BISTNER, S. I.: Corneal endothelium in viral induced anterior uveitis: Ultrastructural changes following canine adenovirus-type 1 infection. *Arch. Ophthal.* Accepted for publication, 1974.
- (290) APPEL, M. and ROBSON, D.S.: A microneutralization test for canine distemper virus. *Am. J. Vet. Res.*, 1973, 34, No. 11, 1459-1463.
- (292) CARMICHAEL, L. E.: Canine herpesvirus in neonatal pups. Chapter in *Current Vet. Therapy V*, Ed. by R. W. Kirk. W. B. Saunders and Co., Philadelphia, 1974, 959-960.
- (293) CARMICHAEL, L. E.: Canine adenovirus infection. Chapter in *Current Vet. Therapy V*, Ed. by R. W. Kirk. W. B. Saunders and Co., Philadelphia, 1974, 964-966.
- (294) DAVIES, D. H. and CARMICHAEL, L. E.: Role of cell-mediated immunity in the recovery of cattle from primary and recurrent infections with infectious bovine rhinotracheitis virus. *Infect. Immunity*, 1973, 8, No. 4, 510-518.
- (295) DAVIES, D. H. and DUNCAN, J. R.: The pathogenesis of recurrent infections with infectious bovine rhinotracheitis virus induced in calves by treatment with corticosteroids. *Cornell Vet.*, 1974, 64, No. 3, 340-366.
- (296) DAVIES, D. H., CORBEIL, L., WARD, D., and DUNCAN, J. R.: A humoral suppressor of in vitro lymphocyte transformation responses in cattle with Johne's disease. *Proc. Soc. Exptl. Biol. & Med.*, 1974, 145, 1372-1377.
- (301) SCHULTZ, R. D.: Immunologic disorders in the dog and cat. Symposium on allergy in small animal practice. *Vet. Clinics of North America*, 1974, 4, No. 1, 153-174.
- (303) SHEFFY, B. E. and RODMAN, S.: Activation of latent infectious bovine rhinotracheitis infection. *J.A.V.M.A.*, 1973, 163, No. 7, 850-851.
- (304) APPEL, M., SHEFFY, B. E., PERCY, D. H., and GASKIN, J. M.: Canine distemper virus in domesticated cats and pigs. *Am. J. Vet. Res.*, 1974, 35, No. 6, 803-806.
- (305) CARMICHAEL, L. E.: Neonatal puppy mortality. Laboratory Report, Series 2, No. 4, May, 1974.
- (306) GEORGE, L. W. and CARMICHAEL, L. E.: A plate agglutination test for the rapid diagnosis of canine brucellosis. *Am. J. Vet. Res.*, 1974, 35, No. 7, 905-909.
- (307) LUST, G.: Research on developmental phases of degenerative hip joint disease in young dogs. *Proc. Canine Hip Dysplasia Symposium and Workshop*, Orthopedic Foundation for Animals, Inc., St. Louis, Mo., October, 1972, pps 62-70.
- (308) LUST, G.: Report on canine hip dysplasia. *J.A.V.M.A.*, 1973, 162, 662-668.
- (309) LUST, G.: Pathogenesis of degenerative hip joint disease in young dogs. *Proc. 23rd Gaines Veterinary Symposium*, Washington State University, Pullman, Wash., November 16, 1973, pps 11-15.

- (310) LUST, G. and CARMICHAEL, L. E.: Properties of canine herpesvirus DNA. Proc. Soc. Exptl. Biol. & Med., 1974, 146, No. 1, 213-217.
- (311) LUST, G., ROENIGK, W. J., GEARY, J. C., and SHEFFY, B. E.: Observations indicating a low incidence of hip dysplasia in beagles. J.A.V.M.A. Submitted for publication, 1974.
- (312) SCHULTZ, R. D.: Comments on the immune response of the fetus and neonate. J.A.V.M.A., 1973, 163, No. 7, 804-806.
- (313) SCHULTZ, R. D.: Developmental aspects of the fetal bovine immune response: A review. Cornell Vet., 1973, 63, No. 4, 507-535.
- (314) SCHULTZ, R. D., with SCOTT, D. W., and FARROW, B. R. H.: Studies on the therapeutic and immunologic aspects of generalized demodectic mange in the dog. J.A.A.H.A., 1974, 10, 233-244.
- (315) SHEFFY, B. E. and KRINSKY, M.: Infectious bovine rhinotracheitis virus in extended bovine semen. Proc. U. S. Anim. Health Assoc., 1974. In press.
- (316) SHEFFY, B. E.: Feeding dogs in 1974, facts and fiction. Gaines Dog Research Center, 1974. In press.



*Sperm engulfed by leukocytes in the reproductive tract of a male dog (left). Note abnormal sperm caused by *Brucella canis* (right). A dog infected in this manner is infertile.*

ACKNOWLEDGMENTS

The Cornell Research Laboratory for Diseases of Dogs gratefully acknowledges gifts received from our contributors from September 1, 1973 to September 1, 1974 in support of our research program.

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- **Onondaga Kennel Association, Inc.
- *Ox Ridge Kennel Club

HUNTS AND CLUBS (Cont.)

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|---|---|
| Patroon Dog Training Club, Inc.
(In Honor of Dr. Robert B. Lamb) | Somerset County Dog Obedience
Club, Inc. |
| Pembroke Welsh-Corgi Club of
America, Inc. | ***Somerset Hills Kennel Club |
| *Penn Ridge Kennel Club, Inc. | South Texas Obedience Club |
| Piedmont Kennel Club | *Spartanburg Kennel Club |
| Port Chester Obedience Club | Suffolk Obedience Training Club, Inc.
(In Memory of Mrs. Charline
Brubaker) |
| *The Pug Dog Club of America | Sunshine Pomeranian Club of Florida |
| Rogue Valley Retriever Club | Susque-Nango Kennel Club, Inc. |
| Rombout Hunt | *Sussex Hills Kennel Club, Inc. |
| *Rubber City Kennel Club | **Thronateeska Kennel Club |
| *Sagehen's Retriever Club | *Toledo Kennel Club, Inc. |
| *St. Petersburg Dog Fanciers
Association, Inc. | **Trenton Kennel Club |
| *Santa Ana Valley Kennel Club, Inc. | *Twin Brooks Kennel Club |
| *Saw Mill River Kennel Club | *United Kennel Club |
| Seaway Valley Dog Club | *Utica Dog Training Club, Inc. |
| *Shreveport Kennel Club, Inc. | *Wachusett Kennel Club, Inc. |
| *Siberian Husky Club of America | *Washington State Obedience
Training Club, Inc. |

IN MEMORIAM

Dr. Conrad H. Alper
 Dr. F. Roy Badgley
 Mrs. Leonard W. Bonney
 Dr. Martin Brownstein
 Mrs. Charline Brubaker
 Dr. Maynard L. Bryant
 Mr. James A. Cole
 Mrs. Julia Coleman
 Dr. Douglas B. Crane
 Dr. J. Stuart Crawford
 Mr. Richard D'Ambrisi
 Mrs. Elizabeth K. Dexter
 Mrs. Benjamin J. Finkelstein

Dr. Kenneth Schuyler Friderici
 Dr. Howard K. Fuller
 Mrs. Robert H. Futh
 Mrs. Margaret C. Lane
 Mrs. William H. Long, Jr.
 Ms. Natalie R. Maas
 Dr. Frank McBride
 Mrs. R. Stuyvesant Pierrepont
 Dr. Vaughn W. Rood
 Mrs. Marjorie Langley Ryan
 Dr. John H. Stack
 Mrs. Gilbert (Berlys) Colburn Thompson
 Mr. Jacob Woolfe

A. WELLS PECK

A. Wells Peck died at the age of 85 on September 15, 1974, as the result of an automobile accident near his home in Litchfield, Connecticut. We shall remember him for nearly a quarter of a century of loyal effort in support of the Cornell Research Laboratory for Diseases of Dogs. Mr. Peck was one of the founders of the Cornell Research Laboratory for Diseases of Dogs in 1950, and he contributed substantially to its success in all of the years that followed.

Mr. Peck was noted as a breeder of Norwegian Elkhounds and he produced some of the finest dogs of the breed. He believed that the relationship between a dog and its owner was very important and that a breeder should show his own dogs. He has been seen nationally in many show rings. The contributions of Mr. and Mrs. Peck to the breed in this country were recognized last year with a special show in their honor in Los Angeles. Also, they were the only Americans to achieve honorary membership in the National Elkhound Club of Norway.

It is with the deepest regret that we have learned of his death and we shall miss his visits, his counsel, and his sincere interest in the health of dogs.

BEQUESTS

DR. VAUGHN W. ROOD

Dr. Vaughn W. Rood, a veterinarian of Springville, New York, for 67 years, died on May 27, 1974. Dr. Rood was born in the Ithaca area in 1884 and attended schools there. He graduated with high honors from the New York State Veterinary College at Cornell University in 1907. He established residence in Springville that year and practiced veterinary surgery there until his retirement in 1974.

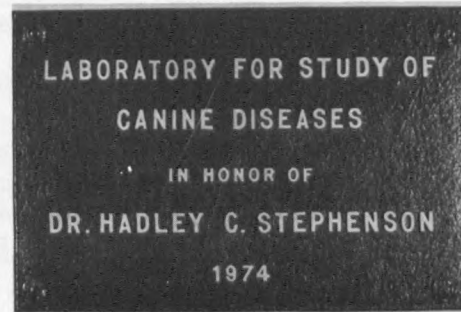
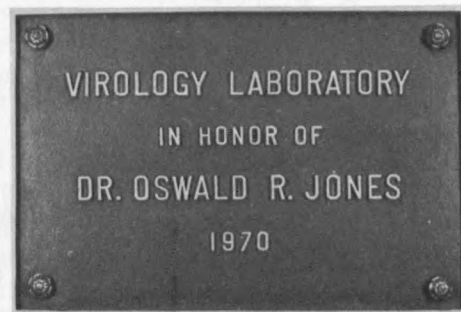
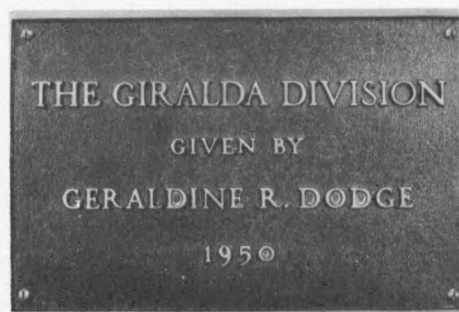
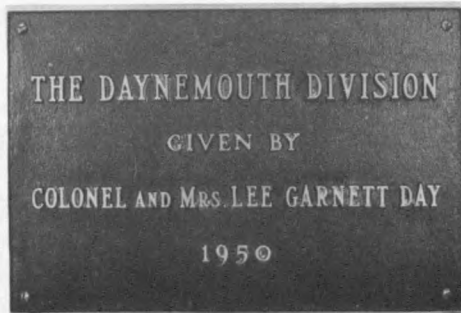
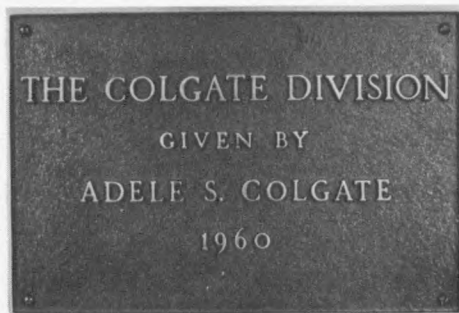
Dr. Rood believed in research to promote better health for animals and demonstrated his confidence in the Cornell Research Laboratory for Diseases of Dogs by making it a beneficiary in his will.

MARJORIE LANGLEY RYAN

Mrs. Marjorie Langley Ryan, a lawyer in New York City, died at her home on Central Park South in March 1973. She was a member of the New York State Bar Association and the Association of the Bar of the City of New York.

Mrs. Ryan was the first and perhaps the only woman licensed as a harbor pilot in New York Harbor. She received her license in the late nineteen-twenties. She also had studied navigation, and had taught Braille at Hunter College.

Mrs. Ryan had great regard for the late Dr. J. Stuart Crawford of New Hyde Park, L. I., who was veterinarian for her dogs for several decades. In his honor, Mrs. Ryan bequeathed a part of her estate to the Cornell Research Laboratory for Diseases of Dogs.



Plaques placed in the Cornell Research Laboratory for Diseases of Dogs to honor some of those persons who have given exceptional interest and support.

In establishing the Institute, of which the Cornell Research Laboratory for Diseases of Dogs is a part, the Board of Trustees authorized the Treasurer's Office of Cornell University to act as custodian of all funds given in support of the Institute. Donors, therefore, are assured of maximum benefit from their gifts by means of this supervision by Cornell University officials. Cornell welcomes any gifts or bequests that will help the work of the Institute. The Legal Department of Cornell University suggests the following provision in making a bequest for dog research:

"I hereby give, devise and bequeath (*description of property*) to Cornell University, an educational corporation located at Ithaca, New York, for the uses and purposes of the Cornell Research Laboratory for Diseases of Dogs."

All checks should be made payable to Cornell University and should be mailed to:

Office of the Director
Veterinary Virus Research Institute
Cornell University
Ithaca, New York 14853

