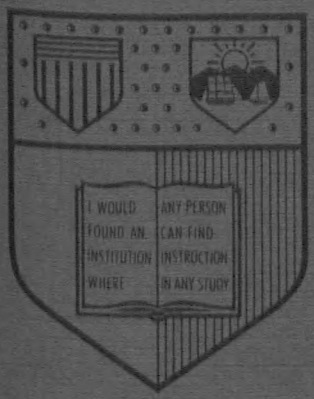
James A. Baker Institute for Animal Health

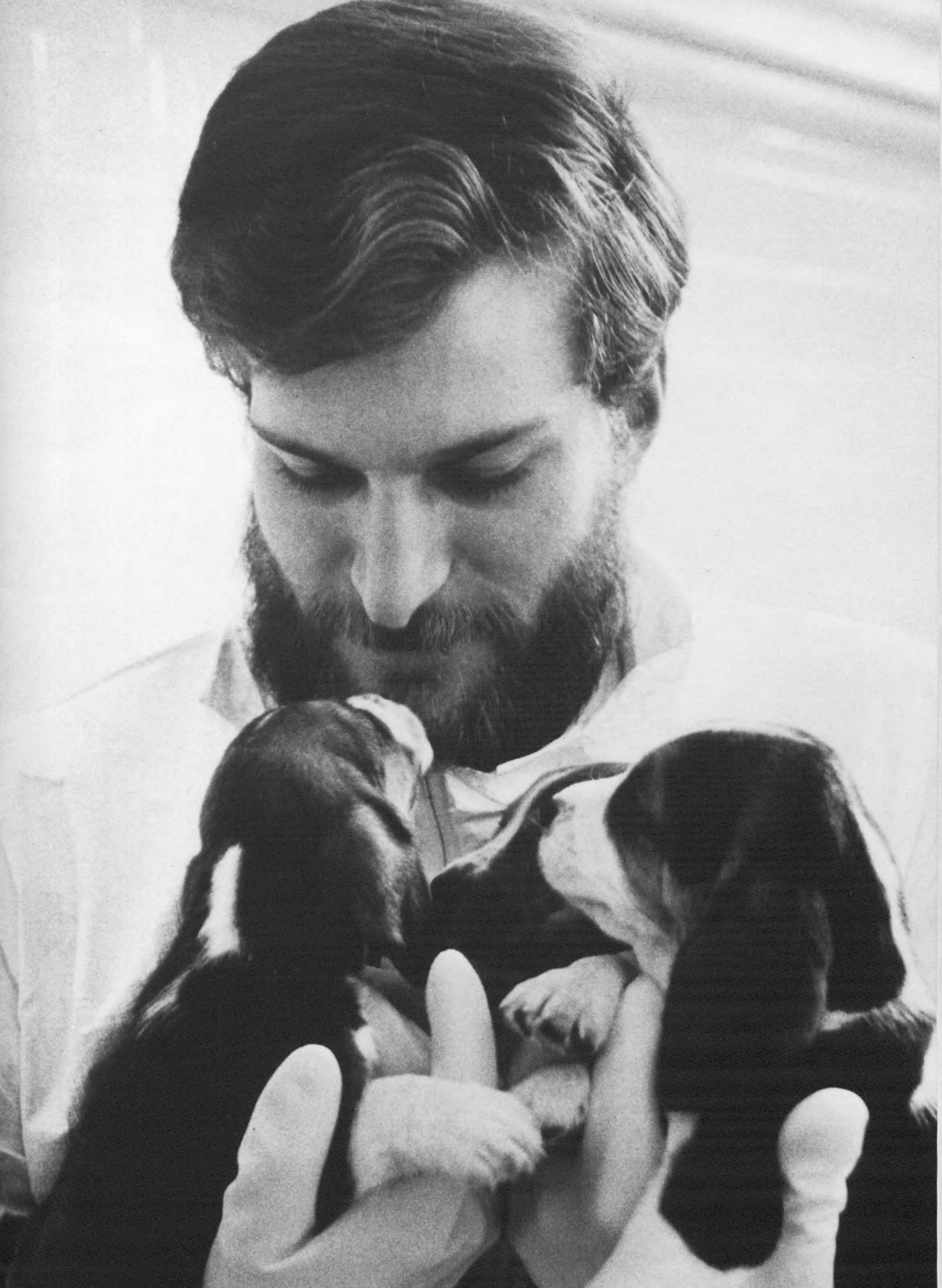
Annual Report 1979



Cornell University

New York State College of Veterinary Medicine
Volume 29

This report honors those
whose generosity sustains the Institute's independence
and commitment to excellence and the pursuit of truth.



A Message from the Director

I am pleased to report that we made important advances in our research this year. We also took steps to ensure our continued productivity in the years ahead. We developed new methods for diagnosing and preventing canine parvoviral disease; made progress in the study of hip dysplasia and nutrition-disease relationships; and gained insight into resistance mechanisms that operate against a variety of infectious agents.

The results of our research were reported in scientific journals and at meetings throughout the world. A copy of our latest laboratory report, "Canine Parvovirus Infection — an Emerging Disease," can be obtained by writing to the Institute or telephoning Mrs. Florence C. Huth (607/277-3044).

Meaningful new advances in health research will require the use of new techniques and the application of information drawn from the cutting edge of science. We have taken measures to meet this challenge; we have recruited new staff, implemented training programs, and made important improvements in our research facilities.

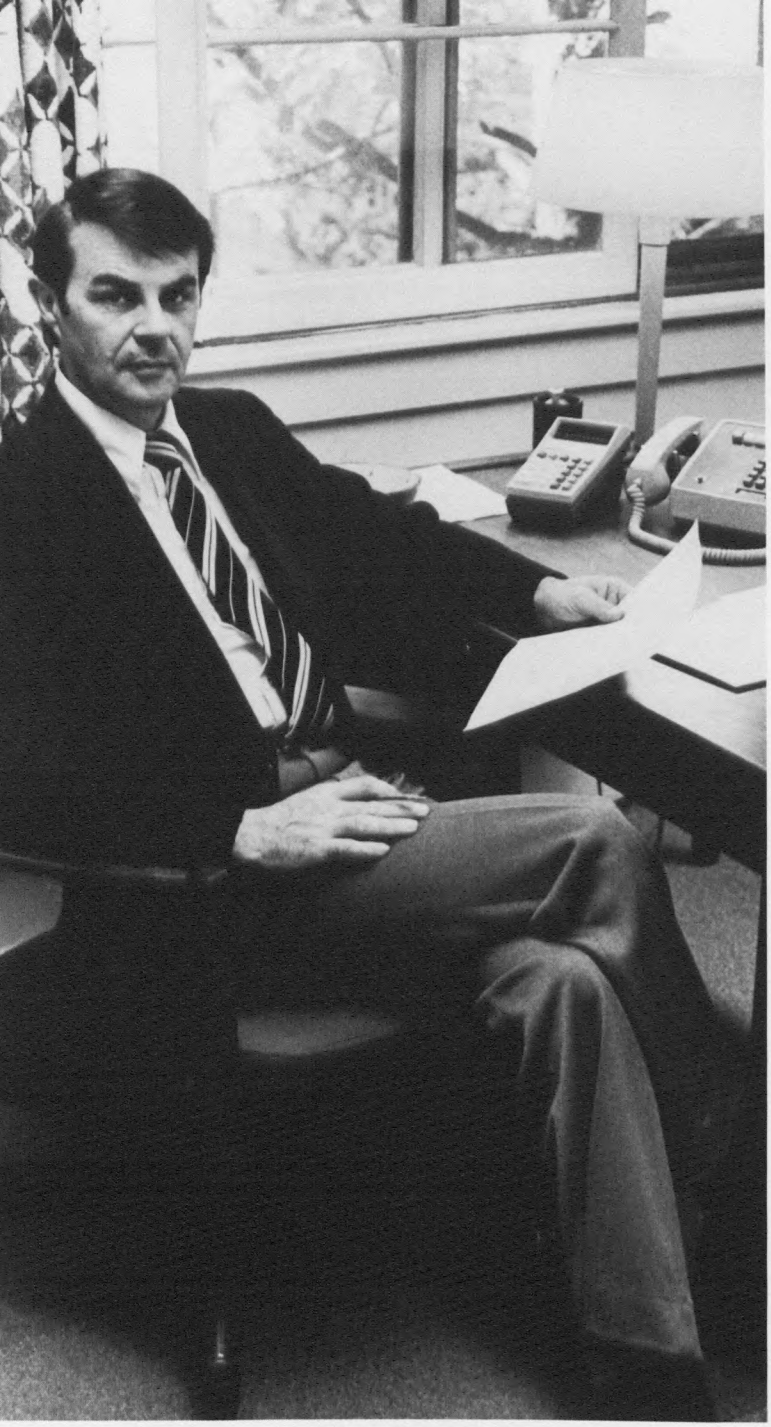
We were particularly pleased this year when Dr. Douglas F. Antczak accepted a position on our permanent research staff. Dr. Antczak is a Cornell graduate who received a V.M.D. from the University of Pennsylvania. Earlier this year Dr. Antczak completed advanced training in immunogenetics at Cambridge University, where he was awarded a Ph.D. Dr. Antczak is exploring the role of inherited factors in disease. The results of his research are expected to provide information that will increase our understanding of infectious processes and degenerative diseases of advancing age.

A second staff appointment was made this year, when Dr. Robin G. Bell was promoted to the rank of assistant professor. Dr. Bell received his undergraduate training at the Australian National University and a Ph.D. in immunology from the same institution. His research has focused on immune response mechanisms in animals harboring intestinal parasites. Dr. Bell has already made significant contributions in this area by defining the response of animals to *Trichinella spiralis,* the causal agent of trichinosis.

Two members of our support staff were honored in 1979. Mr. Michael J. Chapman was elected president of the upstate New York branch of the American Association for Laboratory Animal Science (AALAS). He was also recipient of the Wayne Award. Mr. James E. Young was named AALAS Technician of the Year in recognition of his competence and imagination in managing the Institute's colony of specific pathogen–free beagles.

Although people are of central importance to the success of a research enterprise, productive scientists also require appropriate facilities and modern equipment. To meet this need, the Institute is committed to a three-year $1.7 million capital improvement program. Construction began this year on an addition to the Institute. The new wing will house laboratory animals in a rigorously controlled environment.

The Adele S. Colgate Laboratory was renovated and provisioned with equipment for tissue culture. Media and cells prepared in this laboratory are used throughout the Institute. We are indebted to the Surdna Foundation for a major gift that made this improvement possible.



Above: Neil H. McLain directs the Institute's day-to-day functions.

Above right: Dr. Niel W. Pieper talking with Drs. Pollock and Orsini at the annual meeting of the Advisory Council

Right: A laminar-flow hood ensures the sterile environment needed for growing canine parvovirus.

We were saddened this year by the untimely death of Mr. Frederick A. Hinman and two of our founding benefactors, Mrs. Elizabeth Ireland Poe and Mrs. Eleanor S. Cole. We will all miss Mr. Hinman's friendly manner and his skill in preparing media and cell cultures. Mrs. Poe was among a small group of individuals who founded the Institute's Cornell Research Laboratory for Diseases of Dogs in 1950. Mrs. Cole was also one of our early benefactors. Their interest in the health and well-being of dogs and their support sustained the laboratory in the intervening years.

Expenditures for research have grown significantly in recent years and are now four times the level of just four years ago. This expansion has occurred during a period of intense competition for research funds. Our growth in these circumstances provides evidence of the quality of our work and the capacity of our staff to compete for research grants and contracts from the federal and state governments, foundations, and industry. We also depend on the support of veterinarians, kennel clubs, and individual benefactors. Now more than ever we rely on such gifts to provide the margin of excellence needed to achieve our goals.

Our high hopes for the future are rooted in the knowledge that we have an organization of skilled and dedicated men and women and a large and growing constituency of concerned benefactors. We are also fortunate in being served by an advisory council made up of leaders of the scientific and business communities. Their expert guidance and advice are key ingredients in the Institute's success now and in the years ahead.

Douglas D. McGregor
Director

Staff

Administration

Douglas D. McGregor, director: B.A., M.D., University of Western Ontario; D.Phil., Oxford University
Neil H. McLain, administrative manager: A.B., Cornell
Nancy D. Combs, administrative aide
Florence C. Huth, secretary
Audrey E. Lowes, secretary: A.A., Paul Smith's College
Ann W. Signore, secretary: Cornell
Douglas S. Robson, consultant in statistics: B.S., M.A., Iowa State University; Ph.D., Cornell

Laboratories

Giralda Laboratories for Canine Infectious Diseases

Leland E. Carmichael, John M. Olin Professor of Virology: A.B., D.V.M., University of California; Ph.D., Cornell
Geoffrey J. Letchworth III, graduate research assistant: B.S., Trinity College; D.V.M., Ph.D., Cornell
Roy V. H. Pollock, graduate research assistant: B.A., Williams College; D.V.M., Cornell
Steven J. Zoha, postdoctoral associate: B.S., Lehigh University; Ph.D., Cornell
Jean C. Joubert, research technician
Priscilla H. Dunham, laboratory technician

Daynemouth Laboratory for Canine Nutrition

Ben E. Sheffy, Caspary Professor of Nutrition: B.S., M.S., Ph.D., University of Wisconsin
Marc H. Langweiler, graduate research assistant: B.S., D.V.M., M.S., Cornell
Alma J. Williams, laboratory technician: B.A., University of Pennsylvania; M.S., Cornell

Biochemistry Laboratory for the Study of Canine Hip Dysplasia

George Lust, associate professor of biochemistry: B.S., University of Massachusetts; Ph.D., Cornell
Christine San San Hui-chou, postdoctoral associate: B.S., University of Oregon; Ph.D., Rutgers — The State University
David J. Dueland, graduate research assistant: B.A., University of Colorado
James P. Doerflinger, laboratory technician: A.A.S., B.A., State University of New York at Buffalo
Susan J. Harter, laboratory technician: B.S., Lock Haven State College

Hadley C. Stephenson Laboratory for Study of Canine Diseases

Max J. G. Appel, professor of virology: Dr.med.vet., University of Hannover; Ph.D., Cornell
Shaw-chien Tsai, graduate research assistant: D.V.M., National Taiwan University; M.S., Auburn University; Ph.D., Cornell
Brian E. Johnson, laboratory technician: A.A., Massachusetts Bay Community College; B.S., University of Massachusetts
Mary Beth Metzgar, laboratory technician: University of Evansville

Microbiology Laboratory

Douglas D. McGregor, professor of immunology: B.A., M.D., D.Phil.
Melissa C. Woan, postdoctoral associate: B.Ed., Taiwan Normal University; M.S., Ph.D., University of Illinois
Urban K. Forsum, postdoctoral fellow: M.D., Ph.D., University of Uppsala
Arris J. Chapman, laboratory technician: A.A.S., Carnegie College

Richard A. Recckio, laboratory technician: B.S., State University of New York College at Brockport; M.A., University of South Florida

Oswald R. Jones Laboratory of Immunology

Robin G. Bell, assistant professor of immunology: B.Sc., Australian National University; Ph.D., John Curtin School of Medical Research
Lincoln S. Adams, research technician: B.S., Hobart College; AALAS accreditation
Arlene N. Bercaw, laboratory technician: A.A.S., State University of New York; B.S., Cornell

Immunogenetics Laboratory

Douglas F. Antczak, assistant professor of immunology: B.A., Cornell; V.M.D., University of Pennsylvania; Ph.D., Cambridge University
Linda H. Remick, research technician: A.A.S., State University of New York; B.S., Cornell
Beverley E. Bauman, laboratory technician: B.S., Rochester Institute of Technology

Richard King Mellon Laboratory for Electron Microscopy

Helen A. Greisen, research associate: B.S., M.S., Ph.D., Cornell

Colgate Division for Tissue Culture

Linda H. Remick, research technician: A.A.S., B.S.

Glassware Department

Elizabeth C. Wheeler, supervisor
Julie Ann Alling, junior laboratory technician

Animal Care

Charles B. Bailor, animal technician
Roy L. Barriere, animal technician: AALAS accreditation
Michael J. Chapman, vivarium supervisor: AALAS accreditation
Bernard L. Clark, research technician
Raymond J. Corey, animal technician: A.A.S., State University of New York Agricultural and Technical College
James C. Hardy, research technician: B.S., Cornell
Gerald W. Hiller, animal technician: AALAS accreditation
David L. Watkins, animal technician: A.A.S., State University of New York Agricultural and Technical College; AALAS accreditation
James E. Young, animal technician: AALAS accreditation

Maintenance

Edson Wheeler, maintenance supervisor
Arthur D. Howser, experimentalist
Gerald G. Rice, mechanic
John C. Howe, custodian

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Dykes

Giralda Laboratories for Canine Infectious Diseases

The major goals of our research during the past year were (1) to devise practical methods for rapidly diagnosing illness caused by canine parvovirus (CPV), a serious new infectious disease of dogs, and to develop immunizing agents and strategies for their use; (2) to isolate and purify *Brucella canis* antigens and to characterize them, with the aim of improving diagnostic tests; and (3) to analyze the role of temperature in the pathogenesis of bovid herpesvirus mammillitis.

CPV was isolated in the summer of 1978 from dogs with acute enteritis characterized by depression, vomiting, fever, hemorrhagic diarrhea, and sometimes death (Cornell Research Laboratory for Diseases of Dogs, Laboratory Report, ser. 3, no. 1). Shortly after the initial outbreaks a second form of the disease was recognized — sudden death in four- to twelve-week-old pups from heart failure as a result of parvoviral myocarditis.

The development and standardization of a hemagglutination-inhibition (HI) assay for antibodies to CPV fulfilled the initial objectives. An extension of these studies, which took advantage of the potent hemagglutinating properties of CPV, provided a rapid, sensitive, and inexpensive method for detecting viral antigen in stool samples. Stool hemagglutination-HI tests on fecal samples enable a specific diagnosis to be made within a few hours. The procedure obviates the need for more complicated electron microscopic analysis and is useful in distinguishing CPV from another less pathogenic but ubiquitous parvovirus, the "minute virus of canines." A serological test utilizing HI has also proved a sensitive indicator of parvoviral infection, because high levels of HI antibody are present in affected animals. Few laboratories are currently offering diagnostic services for CPV. Consequently, we have received samples for viral isolation and antibody tests from almost every state and from Canada.

Using the HI test, we determined that CPV is truly a new pathogen. We evaluated nearly eight hundred sera stored, in some instances, for more than eight years in the Institute's collection. Antibody to CPV was not detected in sera collected before June 1978. Thereafter the number of samples containing antibody increased dramatically.

The spread of CPV infection and the occurrence of severe losses in some kennels made the rapid development of vaccines crucial. In collaboration with Dr. Appel we demonstrated that both living and inactivated feline panleukopenia vaccines protect dogs against CPV. The canine and feline viruses are antigenically identical. Inactivated CPV preparations also conferred immunity. These studies provide a practical means for protecting selected animals and have significantly accelerated commercial development of vaccines for the prevention of parvoviral disease. The speedy development in this instance of a novel immunization strategy, using a heterotypic virus, may well set a record for the interval between recognizing a new and serious disease and making practical immunizing agents available.

Further studies of parvoviral disease are in progress. Pups born to either vaccinated or previously infected bitches receive maternal antibody through the placenta and colostrum. This antibody protects pups for several weeks, depending on the bitch's antibody level. But it also interferes with vaccination. We are now working to develop a method to predict the earliest age at which pups can be successfully vaccinated. Other studies are being conducted by Dr. Roy Pollock to evaluate the

duration of protection after vaccination, to identify factors modifying the severity of disease, and to quantitate the amount of virus and the duration of its shed from infected dogs.

Work on canine brucellosis continued. This disease is an important cause of reproductive failure (Cornell Research Laboratory for Diseases of Dogs, Laboratory Report, series 2, no. 7). Dr. Steven Zoha, a microbiologist with expertise in bacterial cell wall structure, joined the laboratory staff this year. Dr. Zoha is studying the cell wall antigens of *B. canis* with the aim of improving the specificity of serodiagnostic tests. Present methods frequently fail to differentiate infected from noninfected dogs. Developing a reliable diagnostic test for canine brucellosis is important because test results often influence decisions about an animal's reproductive career and even its life. Preliminary studies indicate that certain antigens in the cell walls of both the virulent (M+) field strains and a less virulent (M−) laboratory-selected strain hold promise as diagnostic reagents. Characterizing these antigens also furthers our understanding of their role in the disease process.

In studies of bovine herpesvirus mammillitis (BHV-2) Dr. Geoffrey Letchworth demonstrated that both the growth of virus and the immune response of cattle are markedly influenced by temperature. An inverse relation between the effects of temperature on viral replication and the principal immune response mechanism (interferon production) was demonstrated both in cell cultures and in skin. Temperature effects were dramatically shown in the skin of cows where local temperatures were rigorously controlled. Lesions of BHV-2 in chilled skin (2° to 9°C below rectal temperature) were much more severe than in skin 1° to 3°C above rectal temperature. Furthermore, the lesions persisted longer, had greater cellular infiltration and necrosis, and had up to ten billion times as much infectious virus per gram of skin tissue.

Leland E. Carmichael

Vitamin E has a role in preventing damage to cell membranes. All cells are affected, but lymphocytes and erythrocytes are particularly sensitive. Diets nutritionally complete and balanced except for vitamin E (E) and selenium (Se) were fed to dogs. Cultures of lymphocytes from these dogs and from dogs given adequate amounts of E and Se were compared by measuring their response to infectious agents. Lymphocytes from dogs deficient in E and Se did not respond in a manner required for successful defense against disease. When vaccinated, E- and Se-deficient dogs produced less antibody and at a slower rate than did the supplemented dogs. Vaccination of E-deficient puppies with measles virus failed to protect against subsequent exposure to distemper.

When vitamin E nutrition was adequate, a specific function for Se was not demonstrated. However, dietary Se did decrease the requirement for E. Feeding proteins rich in the sulfur-containing amino acids, methionine and cysteine, also spared the dietary need for E. Diets high in polyunsaturated fatty acids (corn oil), on the other hand, greatly increased the dog's requirement for E.

An unexpected finding was that vitamin E deficiency in combination with a high dietary intake of polyunsaturated fatty acids caused the development of a severe dermatosis. This skin disease could not be distinguished clinically from that resulting from an essential fatty acid deficiency. However, analysis of serum from E-deficient dogs revealed elevated levels of the essential fatty acids linoleic acid and arachidonic acid. Preliminary observations suggest that the skin disease in such animals is related to increased synthesis of prostaglandins.

The effect of vitamin E deficiency on structure and function of the eye was reported last year. A degeneration of the epithelium of the retina resulting in night blindness was found in E-deficient dogs. Night blindness is also one of the earliest signs of a vitamin A deficiency. Thus present studies are attempting to define the relationship between vitamins A and E in the eye and their contribution to good vision.

Studies of the role of vitamin C (ascorbate) in dog nutrition and disease were completed. Supplementation of the diet with vitamin C had no beneficial effect. Patterns of viral infection and mixed infections with viruses and bacteria were unchanged in vitamin C–treated dogs. Antibody production was unchanged, and phagocytosis, the process whereby white blood cells engulf and destroy pathogens, was actually reduced in dogs fed high levels of vitamin C.

Vitamin C supplementation did not prevent development of hip dysplasia or osteoarthritis in dogs genetically at risk for this disease. The ascorbate fed was rapidly metabolized, excreted in the urine, or simply not absorbed. The results of our research indicate that the addition of vitamin C to the diet is without benefit to the health of dogs.

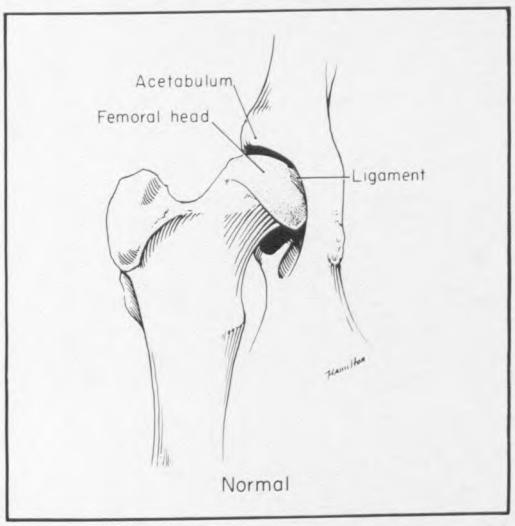
Ben E. Sheffy

Biochemistry Laboratory for the Study of Canine Hip Dysplasia

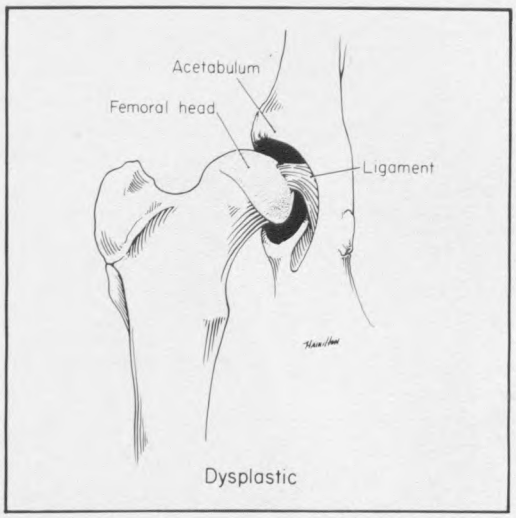
Our research on hip dysplasia focused on the abnormal laxity (instability) of the hip joints of dogs with this disease. The joints of such animals are normal or appear so at birth. Later in life, however, the femoral head is displaced from its normal position in the acetabulum, or joint socket (see accompanying figures). This displacement of the femoral head is the hallmark of hip dysplasia. Displacement is detected by manipulation of the femoral head or by X-ray examination of the pelvis.

We have studied in Labrador Retrievers the sequence of events leading to the development of joint laxity and displacement of the femoral head. We substantiated an observation reported last year, namely that the dysplastic hip joints of young dogs contain a larger than normal volume of synovial fluid. The fluid volume varies in proportion to the degree of femoral head displacement.

In the dysplastic joints of young dogs the round ligament, which holds the femoral head within the acetabulum, is also enlarged. An increase in synovial fluid volume and enlargement of the round ligament was found in some joints in which displacement of the femoral head was not detected by X-ray examination. This finding suggests that the observed changes are early manifestations of the disease process that leads to the development of hip dysplasia.



Normal



Dysplastic

Osteoarthritis accompanies hip dysplasia. Arthritis is the cause of pain and incapacitation. Since accumulation of synovial fluid and swelling of the round ligament are early changes in affected joints, we wanted to determine the relation of these changes to the development of osteoarthritis. Several techniques were used to detect early changes in diseased joints. The expectation was that these changes might provide a clue to the underlying cause of hip dysplasia and the associated arthritis. Our studies indicate that synovitis—inflammation of the membrane lining the joint—precedes and may ultimately prove to be the precipitating cause of other changes. While many factors influence the development and progression of hip dysplasia, our observations provide the basis for further studies that will evaluate methods for treating and preventing this disease.

George Lust

Hadley C. Stephenson Laboratory for Study of Canine Diseases

Parvoviral disease is of great concern to dog owners. The causal agent, canine parvovirus (CPV), was first isolated at the Institute in 1978. Since then we have been working on measures for prevention. We now know that orally transmitted CPV is disseminated throughout the body and that the virus is shed in feces for up to two weeks. This poses a health risk for other dogs.

CPV can cause severe disease and death; however, the infection in laboratory dogs is usually mild. The immune response is rapid, and dogs that survive infection are immune to reinfection. Susceptible dogs can be protected by a single subcutaneous inoculation of either inactivated CPV or live feline panleukopenia virus (FPV), a closely related parvovirus of cats. Inactivated FPV can also protect dogs against CPV, but two injections are required.

Another viral agent, canine coronavirus (CCV), causes a less serious but more protracted intestinal infection. Dogs infected orally become immune to reinfection; subcutaneously injected virus does not protect. This finding by Dr. Paul Meunier suggests that immunity to CCV is induced and expressed locally in the gut. Efforts are being made to develop an effective vaccine using attenuated CCV, but a potential vaccine strain has not yet been found.

Interferon (IF) is an antiviral protein produced in response to many viruses. Since various strains of canine distemper virus (CDV) differ in their capacity to cause disease, it was of interest to compare the ability of these viruses to induce an IF response in dogs. Dr. Shaw Tsai tested several strains. All stimulated the formation of IF. However, only in animals with persistent brain infection was IF found in cerebrospinal fluid up to fifty days after infection. This finding will be explored to determine the role of IF in viral persistence.

Several reports have appeared linking multiple sclerosis (MS) to pet ownership. The implication is that canine viruses may pose a health hazard for humans. While there is little evidence to support this idea, its importance motivated us to search for antibodies to canine viruses in the sera of MS patients. Sera collected from healthy donors were also tested. Low titers of antibodies to CDV were found in nearly all the sera. But the same individuals had antibodies to measles virus (MV). As MV and CDV are similar, it is possible that the antibodies to CDV were generated in response to MV. This seems likely, because antibody to CDV was removed by absorbing the human sera with MV. Similar absorptions of immune *canine* serum had only a trivial effect on the level of antibody to CDV, a finding that implies that the antibodies in canine serum were formed in response to the homotypic virus.

A similar state of affairs may explain the finding of antibodies to canine parainfluenza virus and canine infectious hepatitis virus in human sera. These viruses are similar to viruses that infect humans. Studies in progress will determine whether antibodies to the canine viruses can be removed by absorption. These experiments are technically difficult but involve the same principle used in showing that antibodies to CDV are formed in response to MV.

Max J. G. Appel

Many infectious agents stimulate the formation of antibodies that neutralize the agent or its toxic products. But antibodies afford little if any protection against bacteria, viruses, and protozoan parasites that invade and grow in cells. Antibodies cannot reach organisms when they are protectively accommodated in the cytoplasm of cells. The bacteria that cause tuberculosis, typhoid fever, and brucellosis are examples of such intracellular parasites. Resistance to this group of organisms is mediated by a special class of white blood cells, thymus-derived lymphocytes (T cells). These are formed as part of the animal's immune response to infection. T cells secrete substances (lymphokines) that have powerful effects on other cells. One of these lymphokines acts on macrophages, the cells that scavenge bacteria, to improve their phagocytic capacity and their ability to kill ingested organisms.

We are studying T cells and macrophages to understand how these cells cooperate in the host's defense against infection. The intracellular bacterial parasite, *Listeria monocytogenes,* has been used because it can be handled safely in the laboratory. This organism also infects rats and mice, thus obviating the need to use larger animals. Another reason for using laboratory rodents is that cooperation between T cells and macrophages is determined by genetic factors that can be precisely analyzed in inbred rats and mice. The Institute maintains several strains of rats used for studies of this sort.

We have shown that rats infected with *L. monocytogenes* generate protective T cells. We are now trying to grow these T cells in tissue culture. In the course of these studies we have observed that an extract of *L. monocytogenes* can stimulate lymphocytes to divide, and that lymphocytes from such cultures can attack and destroy other cells. Target cell destruction is determined by measuring the release of a radioactive marker. Target cells coated with the bacterial product are particularly vulnerable. These observations raise questions about the identity of the aggressor cells and the significance of the cytolytic process in the host's defense against infection. Experiments are under way to obtain this information. We are also trying to grow protective lymphocytes in cultures with a view to using these cells in treating disease.

Melissa C. Woan
Urban K. Forsum

Parasitic diseases of humans and domestic animals are major world health problems. These diseases were held in check for a time by insecticides and drugs directed against the vectors of disease — mosquitoes, ticks, and snails. But the picture has changed dramatically in recent years. There has been an alarming increase in vector resistance and growing concern about the harmful impact of insecticides on the environment. Meanwhile, many parasites are becoming resistant to drugs.

The solution may lie in a time-tested approach that has been effective in preventing many viral and bacterial diseases: vaccination. However, protozoan parasites and worms are far more complex than viruses and bacteria, and the diseases caused by them have yielded grudgingly to vaccine prevention. Protozoa and worms express a bewildering array of antigens at various stages in their life cycle. Immunity against them is effective only when it is expressed against each antigen as it appears. This state of affairs suggests that many different antigens will be needed to construct effective vaccines.

Our studies of *Trichinella spiralis,* the causal agent of trichinosis, has shown for the first time that individual antigens of parasites can induce a variety of protective responses. These responses are reflected in different levels of host resistance to infection. The preadult stage of *T. spiralis* exists for only thirty-six hours in the intestine before it differentiates through molting to an adult worm. During this brief period the preadult stimulates several forms of immunity. We now know that this immunity is directed against many antigens, of which two or three are particularly important. Injecting material containing these antigens into rats produces an immunity that is 40 to 50 percent effective against a challenge infection. When the same antigens are given by injection and the animal's intestine is stimulated by an unrelated parasite, one can produce a much higher level of immunity. Further analysis has demonstrated that these two effects—systemic immunity and intestinal stimulation — occur during natural infection with *T. spiralis* and account for the strong immunity induced by this parasite.

We are extending these studies to other species of intestine-dwelling parasites using techniques that have been useful in defining the host response to *T. spiralis.* We want to determine whether interactions between immune responses to phase-restricted antigens are characteristic of worms in general, and whether the information gained in our research can be used to develop more effective vaccines.

Robin G. Bell

Immunogenetics Laboratory

Studies undertaken in this laboratory center around a genetic region known as the major histocompatibility complex (MHC), so called because of its profound influence on the fate of transplanted organ or tissue grafts. This genetic region also controls immune reactions to viruses, bacteria, and certain tumors; it also influences immunological diseases, such as hay fever allergy. We are involved in an applied immunogenetic investigation of the MHC of horses and related studies of lymphocyte reactions in laboratory rodents.

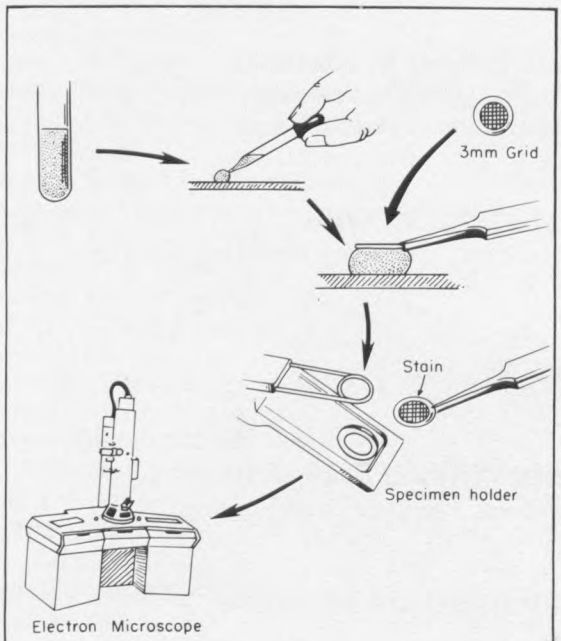
Our equine project, funded by the Harry M. Zweig Memorial Fund for Equine Research in New York State, is designed to develop antibody reagents that can identify genetic markers (the MHC alleles) on the surface of white blood cells (lymphocytes). These genetic markers are highly discriminating. They can be used to exclude horses in cases of parentage dispute on breeding farms. We have also begun a long-term epidemiological study of horses with chronic respiratory disease, commonly referred to as heaves. The expectation is that MHC markers may identify animals with increased risk of contracting this disease. These animals might then be protected during their lifetimes by special immunization regimes, and they might be prevented from breeding, thus decreasing the frequency of deleterious genes in the horse population.

Recent studies by many investigators have demonstrated that thymus-derived lymphocytes (T cells) recognize foreign antigens in association with molecules present on the cell membrane. These recognition structures are coded by the MHC. We are studying in rats a model system that we hope will aid in the understanding of that phenomenon. The model is based on the observation that under appropriate conditions large numbers of antigen-specific T cells can be grown in tissue culture. One condition is that antigens be presented on the surface of living cells. Highly purified, antigen-specific T cell populations can be used to characterize the elusive T cell receptor for antigen. They may also be of value in treating disease.

Douglas F. Antczak

Hip dysplasia is a common disease of dogs. Studies undertaken in this laboratory in collaboration with Drs. Lust and Summers have used both the conventional light microscope and the electron microscope to relate structural changes in diseased joints to the progression of hip dysplasia and the osteoarthritis associated with this disease. The electron microscope is a particularly powerful tool for identifying cells in tissues and cell cultures. Our studies have revealed a hitherto unappreciated early change in the cellular composition of the synovial membrane lining the joint space. The observed change in the synovial membranes of dogs with hip dysplasia provides a clue to the nature of the associated osteoarthritic process. The results of our research are expected to facilitate efforts to modify or prevent the changes in the articular cartilage that cause pain and incapacity.

In addition to doing research, the laboratory has an important service function. It provides diagnostic information to other laboratories that submit cells and infectious material for examination. The identity of some infectious agents can be established only by their appearance in the electron microscope. Minute particles, such as viruses, can be magnified enormously. This feature of the instrument has been used to identify viruses that cause gastroenteritis in dogs. These viruses can be detected in stool samples even when present in small numbers, thereby providing a useful diagnostic test.



PREPARATION OF VIRUS FOR ELECTRON MICROSCOPY

Tissue cultures used for growing viruses are also examined to determine where and how viruses develop in infected cells. This information is used by others to interpret disease processes and to develop vaccines for disease prevention.

Helen A. Greisen

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Acknowledgments

Your interest in the James A. Baker Institute for Animal Health, expressed by your gift, enables us to carry out our day-to-day mission. With your support we can respond swiftly to opportunities as they arise and improve the quality of animal health. Your gift earns the Institute's deepest thanks.

In appreciation for their exceptional interest in the Institute, we should like to express our gratitude to Miss Wendy H. Bicknell, Mr. and Mrs. Albert C. Bostwick, Mr. and Mrs. Gaylord Donnelley, Mrs. Priscilla Maxwell Endicott, Mrs. Trisha A. Murphy, Mr. John M. Olin, Dr. Clarence C. Sapp, Jr., Mrs. William E. Snee, Mr. William F. Stifel, and Mr. Robert W. Woodruff.

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National Retriever Club, Inc.†
New Brunswick Kennel Club, Inc.*
Northern Ohio Beagle Club
North Penn Beagle Club
North Shore Dog Training Club
Oakland County Kennel Club, Inc.*
Obedience Dog Training Club of Waterbury, Inc.
Obedience Training Club of Hawaii, Inc.*
Oklahoma City Obedience Training Club, Inc.*
Old English Sheepdog Club of America*
Old English Sheepdog Club of Greater New York, Inc.
(in honor of Dr. Irene Kraft)
Olympic Kennel Club, Inc.*
Ottawa Kennel Club*
Ox Ridge Kennel Club†
Pacific Northwest Rottweiler Fanciers
Palouse Hills Dog Fanciers, Inc.*
Patroon Basset Hound Club
Penn Ridge Kennel Club, Inc.†
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Poodle Club of Niagara Frontier, Inc.
Port Chester Obedience Club
Potomac Valley Standard Schnauzer Club, Inc.
Pug Dog Club of Greater New York
Queen City Dog Training Club, Inc.
Quinnipiac Poodle Club, Inc.
(in honor of Dr. Richard E. Lau)
Ringneck German Shorthaired Pointer Club, Inc.
Rombout Hunt
Sagebrush Beagle Club
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St. Bernard Club of Buffalo
St. Louis Collie Club
San Antonio Kennel Club, Inc.
Sandusky Kennel Club
Saw Mill River Kennel Club*
Scottish Terrier Club of California
Shetland Sheepdog Club of Northern California
Shreveport Collie Fanciers
Shreveport Kennel Club*
Siberian Husky Club of Greater Pittsburgh, Inc.
Silver Bay Kennel Club of San Diego*
Skyline Cocker Club, Inc.
Somerset County Dog Obedience Club, Inc.*
Somerset Hills Kennel Club, Inc.†
South County Kennel Club, Inc.
Southeastern Brittany Club
Southern California Collie Club
South Texas Collie Club*
South Texas Obedience Club
Spartanburg Kennel Club*
Sussex Hills Kennel Club, Inc.*
Swamp Dog Club
Tanana Valley Kennel Club
Tappan Zee German Shepherd Dog Club, Inc.*
Tennessee Valley Kennel Club*
Tidelands Poodle Club of Virginia*
Tidewater Kennel Club of Virginia, Inc.*
Trenton Kennel Club*
Ulster Dog Training Club, Inc.
(in memory of Mr. Joseph Garone)
Valley of the Sun Boston Terrier Club
Wallkill Kennel Club, Inc.
Washington State Obedience Training Club, Inc.†
Watchung Mountain Poodle Club, Inc.*
Waterloo Kennel Club*
Westchester Kennel Club*
(in honor of Dr. Charles Fletcher)
Western Reserve Kennel Club, Inc.‡
West Highland White Terrier Club of California
(in memory of Mr. John E. McLeod, Sr.)
Willamette Valley Kennel Club
Worcester County Kennel Club, Inc.‡
Wyoming Valley Beagle Club
Yorkshire Terrier Club of the Nation's Capital

Veterinary Associations

Hudson Valley Veterinary Medical Society
Veterinary Medical Association of New York City, Inc.
(in memory of Dr. Edwin R. Blamey and Dr. James R. Kinney)
Western New York Veterinary Medical Association, Inc.
Women's Auxiliary to the New York State Veterinary Medical Society

Foundations and Trusts

Albert C. Bostwick Foundation
C.A.L. Foundation
Geraldine Rockefeller Dodge Foundation, Inc.
Dog Owners Educational League, Inc.
(in honor of Dr. Arthur F. North, Jr.)
Gaylord Donnelley Foundation
Gladys and Roland Harriman Foundation
Walter Kendall Trust
Kroc Foundation
Lakeside Foundation
Louise Foundation
John M. Olin Foundation
Dr. J. E. Salsbury Foundation
Walnut Hall Foundation

Companies

Agway, Inc.
Fort Dodge Laboratories, Inc.
Gaines Dog Research Center
General Foods Corporation
Hounds and Hunting
Norden Laboratories
Norwich-Eaton Pharmaceuticals
Veterinaria AG, Zurich

In Memoriam

Mrs. Jayne M. Aston
Dr. Sherman Ames
Mrs. Barbara Barty-King
Ms. Leila Betz
Mr. Edwin R. Blamey
Mr. James A. Blood
Mrs. Sandy Borow
Mr. Frank Bove
Ms. Mary V. Callahan
Dr. Albert Chafets
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Mr. Hugh MacLean
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Dr. William E. Roy
Mrs. Ada Shirley
Mr. D. M. Skinner, Jr.
Mr. Frank Wottas

Publications

Publications for the first ten years are listed in the Institute report for 1960. Those for each year thereafter appear in the annual report for that year. Since 1960, articles have been numbered consecutively. Some of the following publications have been listed in a previous year's report as *in press*. They are repeated this year, with their original numbers, to record full bibliographic details. Articles completed during the past year are those numbered 460 to 500.

414 **Pollock, R. V. H.:** 1979. The eye. In *Anatomy of the dog.* 2d ed. W. B. Saunders, Philadelphia.

433 **Banta, C. A., Clemens, E. T., Krinsky, M. M.,** and **Sheffy, B. E.:** 1979. Sites of organic acid production and patterns of digesta movement in the gastrointestinal tract of dogs. *J. Nutr.,* 109:1592–1600.

434 **Bell, R. G.:** 1978. Undernutrition, infection and immunity: The role of parasites. *Papua New Guinea Med. J.,* 21:43–55.

435 **Bell, R. G., McGregor, D. D.,** and **Despommier, D. D.:** 1979. *Trichinella spiralis:* Mediation of the intestinal component of protective immunity in the rat by multiple, phase-specific, antiparasitic responses. *Exp. Parasitol.,* 47:140–57.

442 **Jungi, T. W.,** and **McGregor, D. D.:** 1979. Dissociation of macrophage accumulation and local chemotactic activity in inflammatory sites. *Cell. Immunol.,* 47:274–84.

444 **Kostiala, A. A., Lefford, M. J.,** and **McGregor, D. D.:** 1978. Immunological memory in tuberculosis: 2. Mediators of protective immunity, delayed hypersensitivity and macrophage migration inhibition in central lymph. *Cell. Immunol.,* 41:9–19.

447 **McGregor, D. D., Crum, E. D., Jungi, T. W.,** and **Bell, R. G.:** 1978. Transfer of immunity against *Listeria monocytogenes* by T cells purified by a positive selection technique. *Infect. Immunity,* 22:209–18.

448 **Miller, D. R.,** and **Lust, G.:** 1979. Accumulation of procollagen in the osteoarthritic cartilage of dogs. *Biochim. Biophys. Acta,* 583:218–31.

452 **Sheffy, B. E.,** and **Schultz, R. D.:** 1978. Influence of vitamin E and selenium on immune response mechanisms. *Fed. Proc.,* 38:2139–43.

454 **Summers, B. A., Greisen, H. A.,** and **Appel, M. J. G.:** 1979. Early events in canine distemper demyelinating encephalomyelitis in dogs. *Acta Neuropathol.,* 46:1–10.

456 **Tsai, S.,** and **Appel, M. J. G.:** 1979. Interferon induction in dogs. *Amer. J. Vet. Res.,* 40:356–61.

460 **Allhands, R. V., Kallfelz, F. A.,** and **Lust, G.** Joint scintigraphy; an ancillary technique for the diagnosis of hip dysplasia. *Amer. J. Vet. Res.* In press.

461 **Antczak, D. F., Brown, D.,** and **Howard, J. C.:** 1979. Analysis of lymphocytes reactive to histocompatibility antigens: I. A quantitative titration assay for mixed lymphocyte interactions in the rat. *Cell. Immunol.,* 43:304–16.

462 **Antczak, D. F.,** and **Howard, J. C.:** 1978. Allo-antigen specific lymphocyte growth *in vitro. Proc. Physiol. Soc.,* 284:6–7 P.

463 **Antczak, D. F.,** and **Howard, J. C.:** 1979. Analysis of lymphocytes reactive to histocompatibility antigens: II. Exponential alloantigen-dependent lymphocyte growth *in vitro. Cell. Immunol.,* 43:317–25.

464 **Antczak D. F.,** and **Howard, J. C.:** 1979. Analysis of lymphocytes reactive to histocompatibility antigens: III. Detection of inclusion among allo-reactive lymphocyte populations by specific depletion of reactive cells. *Cell. Immunol.,* 46:119–26.

465 **Antczak, D. F.,** and **Howard, J. C.:** 1979. Analysis of lymphocytes reactive to histocompatibility antigens: IV. Detection of inclusion among allo-reactive lymphocyte populations by specific enrichment for reactive cells. *Cell. Immunol.,* 46:127–37.

466 **Antczak, D. F.,** and **Howard, J. C.:** 1979. Lymphocyte subsets reactive to major histocompatibility complex (MHC) antigens do not reject grafts bearing foreign minor histocompatibility (H) antigens. Abstract 5962. *Fed. Proc.,* 38:1356.

467 **Appel, M. J. G.:** 1979. Canine parvovirus infection—an emerging disease. Cornell Research Laboratory for Diseases of Dogs, *Lab. Rep.,* ser. 3, no. 1.

468 **Appel, M. J. G., Carmichael, L. E., Scott, F. W., Greisen, H. A.,** and **Cooper, B. J.:** 1979. Gastroenteritis and leukopenia in dogs: Isolation of a parvo-like virus. Abstract. Fifty-ninth Annual Meeting, Conference of Research Workers in Animal Diseases.

469 **Appel, M. J. G., Cooper, B. J., Greisen, H. A.,** and **Carmichael, L. E.:** 1978. Status report: Canine viral enteritis. *J. Amer. Vet. Med. Ass.*, 173:1516–18.

470 **Appel, M. J. G., Cooper, B. J., Greisen, H. A., Scott, F. W.,** and **Carmichael, L. E.:** 1979. Canine viral enteritis: I. Status report on corona- and parvo-like viral enteritides. *Cornell Vet.*, 69:123–33.

471 **Appel, M. J. G., Gibbs, E. P., Martin, S. J., Utermohlen, V., Rima, B. K., Stephenson, J. R.,** and **Taylor, W. P.** Morbillivirus diseases of animals and man. In *Animal and related viruses,* Comparative diagnosis of viral diseases, vol. 3. Academic Press, London. In press.

472 **Appel, M. J. G., Meunier, P., Glickman, L., Greisen, H. A.,** and **Carmichael, L. E.** Enteric viral infections of dogs. In Proc. Twenty-ninth Gaines Veterinary Symposium. Gainesville, Florida. In press.

473 **Appel, M. J. G., Scott, F. W.,** and **Carmichael, L. E.:** 1979. Isolation and immunisation studies of a canine parvo-like virus from dogs with haemorrhagic enteritis. *Vet. Rec.* 105:156–59.

474 **Bell, R. G.,** and **McGregor, D. D.:** 1979. *Trichinella spiralis:* Expression of rapid expulsion in rats exposed to an abbreviated enteral infection. *Exp. Parasitol.*, 48:42–50.

475 **Bell, R. G.,** and **McGregor, D. D.:** 1979. *Trichinella spiralis:* Role of different life cycle phases in induction, maintenance and expression of rapid expulsion in rats. *Exp. Parasitol.*, 48:51–60.

476 **Bright, S., Antczak, D. F.,** and **Ricketts, S.:** 1978. Studies on equine leukocyte antigens. Proc. Fourth International Congress on Equine Infectious Diseases, 1976. *J. Equine Med. Surg.*, suppl. 1: 229–36.

477 **Carmichael, L. E., Joubert, J. C.,** and **Pollock, R. V. H.** Hemagglutination by canine parvovirus: Serologic studies and diagnostic applications. *Amer. J. Vet. Res.* In press.

478 **Carmichael, L. E.,** and **Pollock, R. V. H.** Viral diseases of pups: Advances in knowledge and recent discoveries. Gaines Breeders' Symposium. Lexington, Kentucky. In press.

479 **Cooper, B. J., Carmichael, L. E., Appel, M. J. G.,** and **Greisen, H. A.:** 1979. Canine viral enteritis: II. Morphologic lesions in naturally occurring parvovirus infections. *Cornell Vet.*, 69:134–44.

480 **Forsum, U.,** and **Hallen, A.:** 1979. Acridine orange staining of urethral and cervical smears for the diagnosis of gonorrhea. *Acta Dermato-venereol.*, 59:281–82.

481 **Forsum, U., Klareskog, L.,** and **Peterson, P. A.:** 1979. Distribution of Ia-antigen-like molecules on non-lymphoid tissues in the guinea pig. *Scand. J. Immunol.*, 9:343–49.

482 **Frelier, P. F., Mayhew, I.G.,** and **Pollock, R. V. H.:** 1979. Bovine sarcocystosis: Pathologic features of naturally occurring infection with *Sarcocystis cruzi. Amer. J. Vet. Res.*, 40:651–57.

483 **Hjelm, E., Forsum, U.,** and **Frodin, L.** Significance of urinary immunoglobulins in tests for antibody coated bacteria. *J. Clin. Pathol.* In press.

484 **Jungi, T. W.,** and **McGregor, D. D.:** 1979. The role of complement in the expression of delayed-type hypersensitivity in rats: Studies with cobra venom factor. *Infec. Immunol.*, 23:633–43.

485 **Jungi, T. W.,** and **McGregor, D. D.** Allogenic restriction in the rat: Genetic basis of restriction of the T cell mediators of delayed-type hypersensitivity and antimicrobial resistance to *Listeria monocytogenes. J. Immunogenetics.* In press.

486 **Klareskog, L., Forsum, U., Malmnas Tjernlund, U., Rask, L.,** and **Peterson, P. A.:** 1979. Expression of Ia antigen-like molecules on cells in the corneal epithelium. *Invest. Ophthalmol. Visual Sci.*, 18:310–13.

487 **Ljunghall, K., Scheynius, A.,** and **Forsum, U.:** 1979. Circulating reticulin autoantibodies of IgA class in dermatitis herpetiformis. *Brit. J. Dermatol.*, 100:173–76.

488 **Lust, G.:** 1979. Hip dysplasia in the dog. *DVM Newsmag.* 10(5):8–11.

489 **Lust, G., Beilman, W. T., Dueland, D. J.,** and **Farrell, P. W.** Intraarticular volume and hip joint instability in dogs with hip dysplasia. *J. Bone Joint Surg.* In press.

490 **Lust, G., Beilman, W. T.,** and **Rendano, V. T.** A relationship between degree of laxity and synovial fluid volume in coxofemoral joints of dogs predisposed for hip dysplasia. *Amer. J. Vet. Res.* In press.

491 **Lust, G.,** and **Farrell, P. W.:** 1979. A relationship between volume of synovial fluid and coxofemoral joint laxity. *Trans. Orthop. Res. Soc.*, 4:182.

492 **Michaelsson, G., Forsum, U., Malmnas Tjernlund, U., Rask, L.,** and **Vahlquist, A.** Serum and epidermal retinol binding protein in *Ichtyosis vulgaris. Exp. Clin. Dermatol.* In press.

493 **Pollock, R. V. H.:** 1979. Canine brucellosis: Current status. *Compendium on Continuing Educ.* 1:255–67.

494 **Pollock, R. V. H.,** and **Carmichael, L. E.:** 1979. Canine viral enteritis: Recent developments. *Mod. Vet. Pr.* 60:375–80.

495 **Rochow, W. F.,** and **Carmichael, L. E.:** 1979. Specificity among barley yellow dwarf viruses in enzyme immunosorbent assays. *Virology,* 95:415–20.

496 **Sheffy, B. E.:** 1979. Canine nutrition—Meeting energy-protein needs of dogs. *Compendium on Continuing Educ.,* 1:345–52.

497 **Sheffy, B. E.:** 1979. Canine nutrition — Carbohydrates, fat and protein. How much is too much? *Compendium on Continuing Educ.* 1:513–19.

498 **Sheffy, B. E.** Canine nutrition—The nutritionally essential mineral elements. *Compendium on Continuing Educ.* In press.

499 **Sheffy, B. E.** Canine nutrition—Vitamins for dogs. *Compendium on Continuing Educ.* In press.

500 **Woan, M. C.,** and **McGregor, D. D.:** 1979. Cell-mediated cytotoxicity (CMC) against bacteria-antigen-sensitized cells by peritoneal exudate cells (PEC) from *Listeria* infected rats. Abstract 4586. *Fed. Proc.,* 38:1094.

Ways of Giving

In establishing the Institute, of which the Cornell Research Laboratory for Diseases of Dogs is an important part, the Cornell University Board of Trustees authorized the Treasurer's Office of Cornell University to act as custodian of all funds given in support of the Institute. As a donor, you are thus assured your gift will achieve the maximum benefit.

There are many ways you can give to advance the work of the Institute. Some of these opportunities offer substantial income tax and estate tax benefits.

Checks. All checks should be made payable to Cornell University and mailed to

Office of the Director
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for the uses and purposes of the Cornell Research Laboratory for Diseases of Dogs.

Appreciated stocks. Selling appreciated stocks is almost certain to increase your taxes. You gain maximum tax benefits by giving the stocks to Cornell outright and deducting their *full* current market value as a charitable contribution, thus avoiding capital gains tax. The transaction can be completed with maximum speed and at lowest cost by following these steps:

1. Decide what securities you want to give, and take the certificate to your bank or broker.
2. Inform your bank or broker that you want to make a gift of these shares or securities to Cornell University for the Institute.
3. Instruct your bank or broker to telephone the Office of University Investments, at 607/277-0022.
4. Write a note to the Director, James A. Baker Institute for Animal Health, Cornell University, Ithaca, New York 14853, including the name of your bank or broker and the form and size of your gift.

Depreciated stocks. You get maximum benefit from a gift of stocks that have gone down in value by selling them and giving the cash proceeds to Cornell. This way you get the capital loss allowance *and* a charitable contribution deduction for the total amount of your gift. Instruct your bank or broker to sell particular shares or securities for your account and send the proceeds as a gift to Cornell for the James A. Baker Institute for Animal Health.

Bequests. Charitable bequests provide substantial estate tax benefits. They can be made in many forms: gifts of land or buildings, securities, personal property, or cash. The University counsel 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."

Deferred giving. An income-producing trust enables you to make a meaningful gift to the Institute, gain spendable income for life, and derive important tax benefits. A beneficiary may be named to receive this income, too. The Institute can offer three plans: the Pooled Life Income Fund for gifts of $5,000 or more, the Annuity Trust, and the Unitrust for gifts of $50,000 or more.

Financial planning involving deferred gifts is a highly complex subject requiring expert advice from your attorney and other specialists. If you are interested in this way of supporting the James A. Baker Institute for Animal Health, please notify the director, who will make arrangements for you to receive more specific information.

Financial Situation

To assure donors that their funds will sustain and advance research on dogs now and in the future, the Cornell University Board of Trustees made a provision that when the Institute's income is in excess of its operating expense, the balance of the funds be added to the Institute's endowment.

July 1, 1978, to June 30, 1979

Funds Available

Gifts and earnings budgeted	$274,764
State of New York general support	105,656
State of New York dog license fees	144,000
Federal grants	340,804
	$865,224

Expenditures

Salaries	$641,563
Operating costs	307,111
	$948,674
Reserves used to balance budget	$ 83,450

Research that involves species other than dogs is supported by other sources.

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