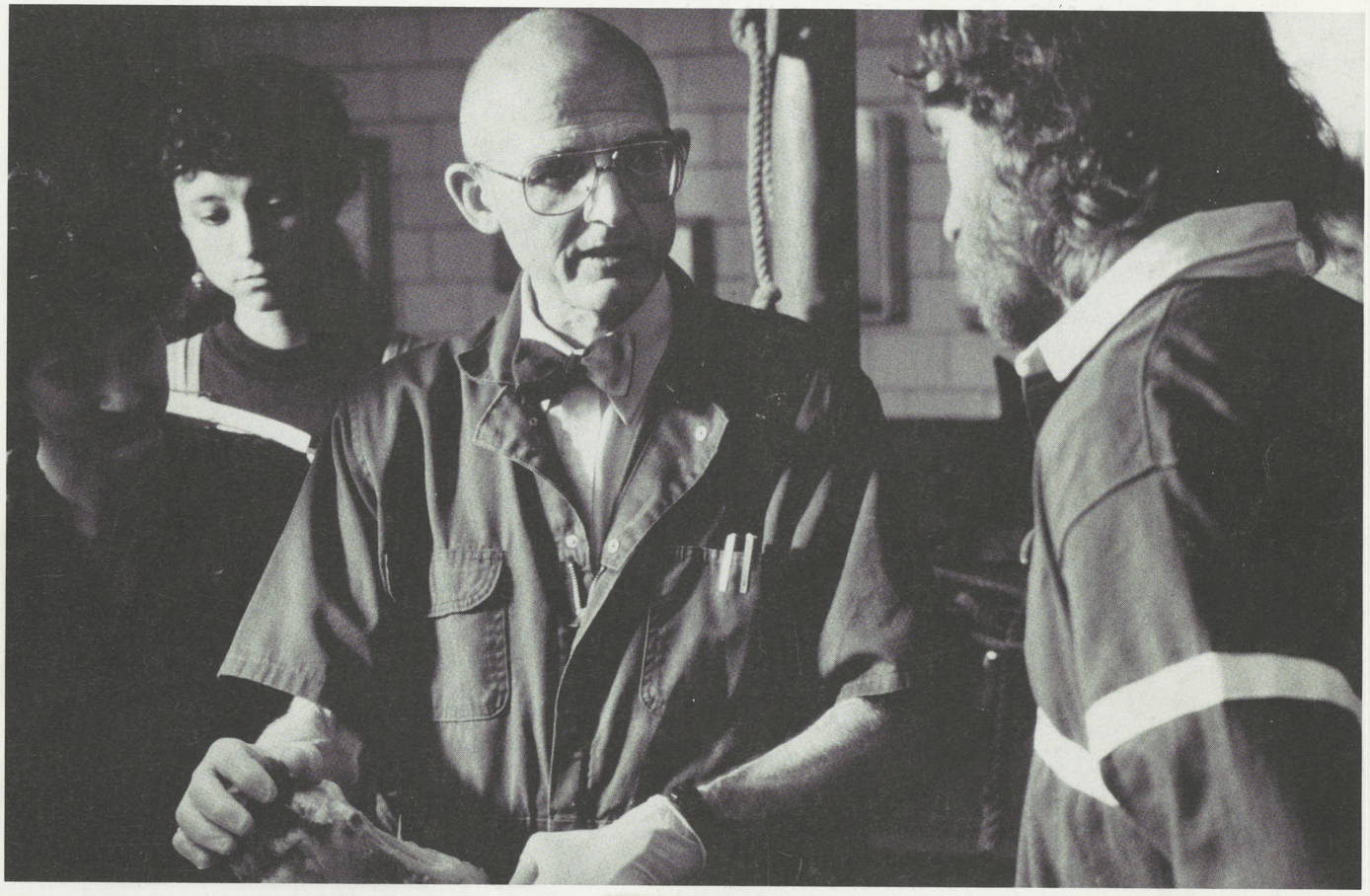
CORNELL
UNIVERSITY



College of Veterinary Medicine

1992–1993 Catalog

Cover: Dr. Alexander de Lahunta, 1992 recipient of the Norden Distinguished Teacher Award, shares insights with students from the class of 1993.

Opposite: Work begins early on a foggy morning at the college's Equine Research Park.

Cornell University
(USPS 132-860)

Volume 84 of the series Cornell University consists of eight catalogs, of which this is number five, dated August 15, 1992. Issued once in February, once in June, once in July, three times in August, once in September, and once in November. Published by Media Services, Cornell University, Comstock Hall, Ithaca, New York 14853-0998.

Second-class postage paid at Ithaca, New York.

Postmaster: Send address changes to "Cornell University," College of Veterinary Medicine, 317 Veterinary Research Tower, Ithaca, New York 14853-6401.

College of Veterinary Medicine

Cornell University 1992–1993

Cornell Academic Calendar

Fall Semester	**1992–93**	**1993–94**
Registration	August 25, 26, 1992	August 24, 25, 1993
Instruction begins	August 27	August 26
Fall recess	October 10–13	October 9–12
Thanksgiving recess	November 25–29	November 24–28
Last day of classes	December 4	December 3
Study period	December 5–9	December 4–8
Examination period	December 10–18	December 9–17
Spring Semester		
Registration	January 21, 22, 1993	January 20, 21, 1994
Instruction begins	January 25	January 24
Spring recess	March 20–28	March 19–27
Last day of classes	May 7	May 6
Study period	May 8–12	May 7–11
Examination period	May 13–21	May 12–20
Commencement	Sunday, May 30	Sunday, May 29

This calendar is subject to modification and is not legally binding.

In enacting this calendar, the university has scheduled classes, laboratories, and examinations on religious holidays. It is the intent of the university that students who miss those activities because of religious observances be given adequate opportunity to make up the missed work.

printed on recycled paper

Produced by Media Services

8/92 3M U E11512G

Contents

Robert D. Phemister '60, dean of the College of Veterinary Medicine.

The College of Veterinary Medicine

After the establishment of Cornell University in 1865, Ezra Cornell insisted that a chair of veterinary medicine be instituted. Cornell's experience as an owner of purebred livestock had taught him the importance of animal health, and he instructed Andrew D. White, the university's first president, to seek out the best-qualified person to teach courses in veterinary medicine and surgery. It was the first time that veterinary science had been granted equal rank with other sciences in an American university.

President White secured the services of James Law, and the appointment was confirmed on August 4, 1868, by the Board of Trustees. A well-educated Scotsman, Law had graduated from the Edinburgh Veterinary College, studied under the great teachers of the day (William Turner in human anatomy and Joseph Lister in the principles and practices of surgery), and attended veterinary schools on the Continent. He also taught at the New York College in Edinburgh and the Albert Veterinary College in London.

Dr. Law's office was on the second floor of Morrill Hall, the first university building to be completed, when classes began October 7, 1868. During the academic year 1869–70 a fairly complete course in veterinary medicine was taught by Professor Law to a class of about twenty. Of this group, two graduated with the Cornell degree of Bachelor of Veterinary Science. One of those individuals, Daniel E. Salmon, returned for additional study and, in 1876, received the D.V.M. degree, the first to be awarded in the United States.

The New York State Veterinary College was established on March 21, 1894. It was the first contract college (later to be known as a statutory college) at Cornell, thereby setting the stage for a long and effective arrangement between the state and the university. A veterinary building (later named James Law Hall) was provided by the state, and the doors were opened for classes in the autumn of 1896. There were six faculty members of professorial rank, two instructors, and eleven students. The scholastic requirement for entrance was a high school diploma or its equivalent, a high standard at the time.

The early faculty recognized the importance of a good library and set this goal as one of their priorities. Governor Roswell P. Flower made a personal donation in 1897 to the library that now bears his name and houses an impressive collection of veterinary and biomedical resource materials.

Women have played an important role in the college since its early days. Florence Kimball, the first woman to receive the D.V.M. degree in the United States, graduated from Cornell in 1910. Seven of the first eleven women to become licensed veterinarians in this country were Cornell graduates.

The college remained at its original site at the southeast corner of East Avenue and Tower Road until the summer of 1957, when it moved to the present site at the east end of Tower Road. The main group of buildings occupies about twenty acres, with ancillary facilities on Snyder Hill and elsewhere. The latest additions are the ten-story Veterinary Research Tower, dedicated June 27, 1974, and the Diagnostic Laboratory, dedicated October 17, 1978. A major expansion of college facilities is currently underway. The Veterinary Education Center, consisting of expanded lecture, laboratory, and library facilities, is nearing completion. The Veterinary Medical Center will contain a new Veterinary Medical Teaching Hospital and greatly expanded office and research space. It is scheduled to be completed in 1995.

The teaching, research, and service programs of the college are recognized as among the best in the world. Each mission supports the others and contributes to the vitality of the entire program. A staff of approximately 900 supports the college's programs. The college's instructional activities include the professional degree (D.V.M.) program for 320 women and men; graduate programs leading to a Ph.D. or M.S. degree in the graduate Fields of Veterinary Medicine, Immunology, Physiology, Environmental Toxicology, and others for approximately 115 students; and intern and residency programs in the departments of Clinical Sciences and Pathology that educate about 30 D.V.M.'s for advanced work in clinical specialties.

Admission to the D.V.M. Program

Admissions coordinator

Office of Student Services
C-106 Schurman Hall
607-253-3700

Admission Policy

The Faculty Committee on Admissions endeavors to select the applicants, who, in its judgment, will be most able to successfully complete the veterinary medical curriculum and become competent, responsible veterinarians.

Sixty of the 80 students admitted to each class are from New York State. The college also contracts with the states of New Hampshire and New Jersey, and with Puerto Rico for a specific number of students. A limited number of nonresident, noncontract positions are also available, and students with superior qualifications, regardless of residency, are encouraged to apply.

Criteria

In conducting its evaluation, the admissions committee is guided by the following criteria for determining the best-qualified applicants.

• **Academic Achievement and Aptitude:** The need for learning and applying large amounts of factual information means that successful applicants must have demonstrated achievement and potential for comprehension of scientific data and processes and an ability to solve complex problems. That ability is evaluated by examination of all college-level courses taken and by consideration of Graduate Record Examinations scores.

• **Quality of the Preparatory Program:** Since the curriculum leading to the Doctor of Veterinary Medicine (D.V.M.) degree is academically rigorous, the committee takes into consideration the quality of the academic program presented by the applicant for admission. The variety and difficulty of courses taken and the ability to carry a heavy academic course load at a challenging institution are evaluated. The selection of a major is left to the individual, as no preference is given to applicants majoring in any particular field.

• **Experience, Knowledge, and Achievement Related to Animals and the Veterinary Profession:** An applicant's experience in working with animals and an understanding of the veterinary profession are viewed by the admissions committee as important considerations in the selection process. Such experience could involve breeding, rearing, feeding, and showing various kinds of animals, including companion animals, livestock, laboratory animals, zoo animals, or wildlife.

The applicant should be prepared to present evidence of practical experience with animals and sufficient contact with the veterinary profession to enable the admissions committee to determine that the applicant has adequate understanding of the duties and responsibilities of a veterinarian and the scope of veterinary medicine.

• **Experience, Knowledge, and Achievement in Activities Not Directly Related to Veterinary Medicine:** The well-rounded applicant demonstrates significant achievements outside of academic and veterinary-oriented activities. Therefore, the committee evaluates the depth and breadth of accomplishment in extracurricular activities, community services, hobbies, and nonacademic interests of all kinds.

• **Personal Characteristics:** The committee endeavors to select applicants of integrity, reliability, maturity, and determination. It is important that future veterinarians possess excellent oral and written communication skills, poise, leadership ability, and the ability to interact effectively with others.

• **Academic Preparation:** Admission to the College of Veterinary Medicine at Cornell requires a minimum of three years of preparation in an accredited college or university. Application may be submitted at the beginning of the third year of college if the student has fulfilled the requirements. This preparation does not have to be completed in a specialized college or in a designated preveterinary program. Potential applicants should enroll in an undergraduate institution with a reputation for academic excellence that offers the prerequisite courses as part of an accredited baccalaureate program. The ideal candidate has a broad education from a rigorous program that includes an introduction to the primary areas of human knowledge: the arts, humanities, social sciences, natural sciences, and mathematics. In addition to the specific prerequisite courses listed below, the admissions committee considers evidence that candidates have sought to develop the general skills, attitudes, and values of an educated person. These include (a) the ability to read with comprehension and to write and speak with clarity and precision; (b) a sense of the physical, biological, social, and historical context in which we live our lives; (c) some insight into a time and culture other than our own; and (d) the ability to work with precision, rigor, and understanding in a chosen discipline.

The following course requirements are prerequisites for admission to the professional degree program in veterinary medicine:

All prerequisite courses should be completed and documented with a letter grade of C- or better at the time of application. It is possible to apply with up to 7 credits in progress at the time of application, provided that at least one semester of any two-semester series has been completed. All requirements must be completed prior to the end of the spring term preceding matriculation. Prerequisite courses may not be taken in the summer immediately preceding entry into the D.V.M. program.

The Admissions Committee reserves the right to review the content of courses submitted in fulfillment of these requirements to ensure an adequate, current knowledge base.

Guaranteed Admission

The college allows highly qualified second-year college students to apply for admission and be guaranteed a position in the class following their third year of college (or, at their option, fourth). It is hoped that if students are notified of their acceptance into the program before their third year of college, they will choose to either broaden their undergraduate education or focus on a particular academic interest.

Applications for guaranteed admission are due April 1 in the Office of Student Services. Details about the program may be obtained by contacting the admissions office or by sending in the postcard at the back of this catalog.

	Minimum Semester Credits	*Minimum Quarter Credits*
English composition*	6	9
Biology (with laboratory)	6	9
Inorganic chemistry (with laboratory)	6	9
Organic chemistry (with laboratory)**	6	9
Biochemistry (upper division)	4	6
Physics (with laboratory)	6	9
General microbiology (with laboratory)	3	4.5

* One-half of this requirement may be satisfied with an oral communication course.
** Chemistry 251 and 253 at Cornell University will satisfy this requirement.

Application Procedures

Application forms and detailed information may be obtained by writing to the Admissions Coordinator, Office of Student Services. Application materials will be ready for distribution August through October annually. The complete application material, application fee, and supporting documents must be submitted to the admissions office by November 1.

Graduate Record Examinations: The Graduate Record Examinations (GRE) general test is required of all applicants. The test must be taken no later than October of the year before desired matriculation. Scores from examinations taken more than five years before the application deadline will not be considered.

The Educational Testing Service, Box 955, Princeton, New Jersey 08540 administers the GRE. Results of the examinations will be reported to the college if the institution code R 2549, College of Veterinary Medicine at Cornell, is properly entered on the test forms.

The desirable minimum score for the aptitude portion (verbal and quantitative) is 1200. No advanced test is required.

Advanced Standing: Applicants for transfer with advanced standing as members of the second- or third-year class must present educational qualifications and professional accomplishments similar to those expected of continuing students. Unless attending one of the schools or colleges of veterinary medicine accredited by the American Veterinary Medical Association (AVMA), applicants must satisfactorily pass examinations in all of the work for which they desire advanced credit. No one will be admitted to any advanced class except at the beginning of the college year in August. The applicant must file a formal application by April 15. Places for admission with advanced standing are limited and depend on vacancies occurring in that particular class. Those seeking transfer from veterinary medical schools not accredited by the AVMA

must provide detailed, translated summaries of the curriculum and official translations of transcripts for all courses completed.

Further Information: For more information or an application packet, please contact the admissions coordinator, Office of Student Services.

University Requirements

Applicants accepted for admission are required to pay a registration fee and will be notified of the amount and the due date at the time of acceptance. No refunds will be made to applicants who withdraw after the due date of the fee.

Entering students must also fulfill the health requirements adopted by the Board of Trustees of Cornell University before being allowed to register.

Combined Programs

Double Registration: Through a program of double registration, it is possible for D.V.M. students who did their preveterinary work in the College of Agriculture and Life Sciences at Cornell University, and who were accepted after their third year of undergraduate study, to complete a B.S. degree while working on the D.V.M. degree. Students interested in this program should consult their undergraduate faculty advisers.

D.V.M./Ph.D. Programs: Veterinary students aspiring to academic or research careers may apply for the combined D.V.M./Ph.D. program. Details of this program are provided in the section on the Graduate School.

The D. V. M. Curriculum

The Doctor of Veterinary Medicine (D.V.M.) degree program at Cornell University is organized in a core-selective format. Approximately 90 percent of the current curriculum is comprised of required core courses. In addition, students are required to satisfactorily complete a minimum of 14 Selective credits (two credits in year one and four credits in each of years two, three, and four).

Emphasis during the first two years of the curriculum is on the basic science subjects central to veterinary medicine and the biomedical sciences. The typical instructional format is a combination of lecture and associated laboratories, with small group tutorial sessions being used increasingly in several courses. Students are introduced to the foundations of clinical medicine during year one in an applied course of the same name. Subjects taught in the third year are primarily related to the clinical sciences. Some courses, for example, Surgical Exercises and Theriogenology, include applied laboratories where students have the opportunity to develop technical skills in clinical disciplines. Rotations in the various clinical services of the Veterinary Medical Teaching Hospital form the basis for the fourth-year curriculum. Selective courses in year four include the opportunity to participate in external clinical rotations, such as hospitals at other academic institutions, specialized private practices, and zoological facilities.

Requirements for Graduation

The prescribed four-year curriculum leading to the degree of doctor of veterinary medicine (D.V.M.) is registered with the state of New York under HEGIS program #1218. To receive this degree, candidates must successfully complete the courses named in the following curriculum, pay all fees due, and be recommended for graduation by the faculty of the College of Veterinary Medicine.

The academic year, divided into two terms, begins in late August and ends in late May. At the conclusion of each term, the college faculty reviews the records and conduct of students. Students whose grades are not satisfactory may be denied permission to register in the subsequent term or to graduate or may be assigned varying degrees of academic warning or probation.

Use of Animals in the Curriculum

Applicants for the D.V.M. program should know and understand the following criteria relative to the use of animals in the D.V.M. teaching program, as passed by the faculty in 1988.

1. Live animals will be used for teaching in certain obligatory core courses.

2. Some of the animals will require humane euthanasia after they have been used for teaching.

3. The college conforms to the rules for the care of such animals as outlined in *Guiding Principles in the Care and Use of Animals*, as approved by the Council of the American Physiological Society, and the *Guide for the Care and Use of Laboratory Animals*, DHEW publication number 86-23 (revised 1985).

4. Each course in which animals are used receives a formal review annually by the college Committee on the Use of Live Animals in Teaching.

5. Any concerns regarding the use of live animals in teaching should be addressed first to the faculty member responsible for that course. Alternatively, students may choose to address their concerns to the chair of the Committee on the Use of Live Animals in Teaching, whose name may be obtained from the Office of Student Services or from the dean's office. The chair may initiate discussion between the said committee and the faculty member responsible for a particular course without involving the student if he or she would prefer to remain anonymous.

Applicants must acknowledge having read the above information by signing the application form in the designated place.

Special Opportunities for Veterinary Students

Many opportunities are available for students who have special species or career interests. Some examples are listed below:

Selective Courses

Horse Lameness

Advanced Techniques in Food Animal Surgery

Llama Tutorial

Dentistry (small animal)

Goats: Management and Diseases

Diseases of Exotic Pets

Wildlife Pathology

Student Clubs

American Animal Hospital Association (small animal)

American Association of Avian Veterinarians

American Association of Bovine Practitioners

American Association of Equine Practitioners

Summary of D.V.M. Curriculum

First Year

Fall Term			*Credits*
VETA	500	Gross Anatomy: Small Animal	4
VETA	502	Microscopic Anatomy*	—
VETA	504	Neuroanatomy and Clinical Neurology*	—
VETA	507	Animal Development	3
VETPH	526	Systems Physiology I	6
VETPH	528	Veterinary Ethics*	—
VETCS	568	Foundations of Clinical Science I	2
VETCS	581	Animal Nutrition	2
			17

Spring Term			*Credits*
VETA	501	Gross Anatomy: Large Animal	5
VETA	502	Microscopic Anatomy (continued)	3.5
VETA	504	Neuroanatomy and Clinical Neurology (continued)	2.5
VETA	508	Anatomy of the Fish and Bird	0.5
VETMI	515	Veterinary Immunology	2
VETPH	527	Systems Physiology II	5
VETPH	528	Veterinary Ethics	1
VETCS	569	Foundations of Clinical Science II	2
			21.5
		Selectives (to be taken either fall or spring)	2†

*Begins in the fall term and continues through spring term.
†Students who are required to take Animal Nutrition are excused from taking selectives in the first year. Those not taking nutrition must complete two credits of selective coursework.

Second Year

Fall Term			*Credits*
VETMI	510	Veterinary Parasitology	4
VETMI	516	Infectious Diseases I	4
VETMI	517	Infectious Diseases II	2
VETPR	528	Pharmacology I	4
VETPA	535	Veterinary Pathology I	4
VETCS	545	Epidemiology	2
			20

Spring Term			*Credits*
VETMI	518	Infectious Diseases III	2
VETPR	529	Pharmacology II	2
VETPA	536	Veterinary Pathology II	4.5
VETCS	561	Theriogenology I	3
VETPA	571	Clinical Pathology	3
VETCS	579	General Medicine and Surgery	4
			18.5
		Selectives (to be taken either fall or spring)	4

American Association of Sheep and Goat Practitioners

American Association of Zoo Veterinarians

Avian Clinic

Teaching Hospital Rounds

Cardiopulmonary Rounds*

Large Animal Medicine Rounds

Large Animal Surgery Rounds

Neurology/Ophthalmology Rounds*

Pathology "Bottom Line" (Selective course)*

Pathology "Show and Tell"*

Radiology Rounds*

Small Animal Medicine Rounds

Small Animal Surgery Rounds

*These rounds are not species-specific.

Third Year

Fall Term			*Credits*
VETA	505	Applied Anatomy	1
VETCS	548	Anesthesiology	1
VETAV	555	Avian Diseases	2
VETCS	562	Theriogenology II	3
VETCS	563	Large Animal Medicine and Surgery	5
VETCS	566	Radiographic Techniques	1
VETCS	567	Clinical Nutrition	2
VETCS	583	Small Animal Medicine and Surgery	5
			20

Spring Term			*Credits*
VETA	506	Applied Anatomy	1
VETCS	520	Preventive Medicine in Animal Health Management	1
VETDL	531	Regulatory Medicine	Req.*
VETPA	539	Laboratory Animal Medicine	1
VETCS	564	Large Animal Medicine and Surgery	6
VETCS	582	Large Animal Surgical Exercises	2
VETCS	584	Small Animal Medicine and Surgery	7
VETCS	586	Small Animal Surgical Exercises	2
			20

Selectives (to be taken either fall or spring) 4

*The abbreviation "Req." indicates that a course (or its equivalent) is required for graduation, but no formal credit is awarded for that course.

Fourth Year*

Required			*Credits*
VETPA	540	Pathology Service	2
VETCS	572	Senior Seminar	1
VETCS	574	Large Animal Surgery Service	4
VETCS	575	Ambulatory Service	4
VETCS	578	Clinical Anesthesiology	3
VETCS	580	Radiology Service	2
VETCS	589	Small Animal Medicine and Community Practice Services	6
VETCS	591	Small Animal Surgery Service	4
VETCS	593	Ophthalmology Service	2

Required			*Credits*
VETCS	594	Large Animal Medicine Service	3
VETCS	598	Dermatology Service	2
			33†
Selectives			
VETCS	547	Practice Management	2
VETPA	549	Laboratory Animal Clinical Rotation	2
VETCS	570	Theriogenology Service	2–4
VETCS	596	Opportunities in Veterinary Medicine	variable

*The academic calendar for senior students was modified in 1992 to include the summer months following the junior (third) year. This allows fourth-year clinical rotations and Selective courses to be scheduled over a twelve-month period (May to May), rather than being restricted to the fall and winter semesters. An employment or vacation period is available at varying times during the year, depending on the individual's schedule.

†A minimum of 4 additional credits must be completed. These may be obtained either by repeating 2 or 4 credits (weeks) of the required rotations or by choosing from the selective courses listed.

Finances

Director

Gloria R. Crissey
Director of financial aid
C-106 Schurman Hall
607-253-3765

Tuition and Fees

Tuition and fees for doctor of veterinary medicine degree candidates are $11,000 a year for New York State residents and $14,000 a year for nonresidents. Most students in the college do not live in university housing. The cost of room and board in Ithaca for 1992–93 is estimated at $6,150. Books, instruments, and supplies cost approximately $725 a year. An additional allowance of $3,570 should be made for clothing, laundry, local transportation, entertainment, telephone, and incidentals. These estimates are based on standard budget figures provided by the university's Office of Financial Aid and Student Employment for the purpose of allocating funds and budgeting for financial aid. Individual expenditures may exceed these figures, depending on personal preferences in housing, transportation, dining, and so on. The amount, time, and manner of payment of tuition, fees, or other charges may be changed at any time without notice.

Students who want to pay tuition in monthly installments should contact the Office of the Bursar. Information about this plan is mailed to parents of continuing students in April of each year and to parents of incoming freshmen and transfer students in May of each year.

Courses of Study describes university policies, student services, fee schedules, and payment procedures.

Refund Policies

Part of the amount personally paid for tuition will be refunded if the student obtains an official certificate of leave of absence or withdrawal at the office of the dean or director of the academic division involved. Students who terminate their registration in the university in this manner before the start of the seventh week of a regular term will be charged tuition from the official university registration day to the effective date of the certificate on a pro rata basis. Contact the Office of the Bursar, Cornell University, 260 Day Hall, Ithaca, New York 14853 (telephone: 607-255-2336) for details.

The university makes available tuition insurance, which provides refunds in the event of leave of absence or withdrawal for medical or emotional reasons. Applications and complete details regarding this coverage accompany the August tuition bill.

The $40 application fee for university residence halls is nonrefundable except when lack of space prevents the offer of a room assignment, in which case a full refund will be made on request.

Students who withdraw from a prepaid dining plan during a semester are eligible for a prorated refund based on the number of days the contract was in effect.

Financial Aid

Information and guidance regarding financial aid for veterinary students is available from the college Office of Financial Aid. A description of the methods, procedures, calendar, resources, and policies may be found in the college publication *Financial Aid Handbook: A Guide to Student Financial Aid at the College of Veterinary Medicine at Cornell University*, which is updated annually. Approximately 85 percent of the financial aid available for the coming year will be through loans and other forms of self-help. The college's policy of support is based on the assumption that parents and spouses are willing to help finance the education of their family members to the extent possible.

To standardize procedures and provide uniform criteria for estimating family financial strength, the college uses the Graduate and Professional School Financial Aid Service (GAPSFAS) and federal income tax information. The college's Office of Financial Aid conducts individual need analyses, and available aid is recommended accordingly. Financial aid packages prepared by the college's Office of Financial Aid may combine loans, employment, and gifts or grants.

A veterinary student who desires financial aid should request a GAPSFAS application form (available in January) from the college and should complete it by March 1 for aid beginning the following autumn. Application for financial aid does not affect the admissions evaluation process. Residents of New York State who qualify for Tuition Assistance Program (TAP) awards should apply each year to the New York State Higher Education Services Corporation, 99 Washington Avenue, Albany, New York 12255. Applications should be submitted in early summer; the deadline is May 1 of the academic year for which aid is requested.

Loan Sources

Long-term loans are available to students enrolled in the College of Veterinary Medicine through the Stafford Loan Program, the Health Professions Loan Program, the Perkins Loan Program, Supplemental Loans for Students, and the Health Education Assistance Loan Program. These loans are authorized and regulated through the Federal Student Aid Program, and repayment is guaranteed by the federal government. The college also administers Cornell University loans, which are available to veterinary students on a very limited basis. Repayment of principal on these loans is totally deferred while the student is enrolled at least half-time. Interest on Stafford, Health Professions, Perkins, and Cornell University loans is also deferred during periods of at least half-time enrollment. Interest rates vary according to the source of the loan. The above table summarizes the terms of these loan programs.

Provisions of Education Loan Programs

The College of Veterinary Medicine also has short-term, interest-free emergency loans available to students whose aid payments for the current term have been delayed for reasons beyond the student's control. Funds for these loans come from the following sources: the Cornell Veterinary Alumni Association, the New York State Veterinary Medical Society, the family of David E. Wright '12, the National Association of Federal Veterinarians Emergency Loan Fund, the Student Emergency Loan Fund of the Auxiliary to the New York State Veterinary Medical Society, the Charles H. Webster Veterinary Fund.

The Auxiliary to the American Veterinary Medical Association (AVMA) also has limited loan monies available to third- and fourth-year veterinary students. Those are short-term loans that are *not* guaranteed by the government. Application is made directly to the Auxiliary to the AVMA.

Scholarships for Veterinary Students

Veterinary students may receive help from various scholarship funds throughout the four-year course of study. The nature and extent of such assistance depends on financial need, scholastic achievements, specific criteria established by each benefactor, and recommendations of the appropriate college committee. Application is through submission of the GAPSFAS financial statement. A Student's Statement of Personal Interests is also required to assist in the matching of applicants to awards with eligibility criteria other than financial need.

Scholarship Committee evaluations are completed at the end of the spring semester. Scholarship awards are credited to the student's bursar account in two equal payments, one at the beginning of each term.

College of Veterinary Medicine Grant. Awarded on the basis of financial need, grant funds are allocated to the college by Cornell University.

	Stafford	*SLS*	*HEAL*	*Perkins*	*HPSL*	*Cornell*
Annual Maximum	$7,500	$4,000	$20,000	None	Tuition +$2,500	None
Aggregate Maximum	$54,750	$20,000	$80,000	$18,000	None	None
Interest Rate	7%–10%	T-Bill +3% Max 12%	T-Bill +3% No Max	5%	5%	8%
In-School Repayment	No	Interest	Interest	No	No	No
Origination Fee	5%	None	None	None	None	None
Insurance Premium Fee	up to 3%	up to 3%	8%	None	None	None
Grace Period	6 months	None	9 months	6/9 months prev/new	1 year	6 months
Minimum Monthly Repayment	$50	$50	May be graduated	$30	$15	$30
Maximum Years to Repay	10	10	25	10	10	10

Note: It is important to remember that regulations governing any given loan program are subject to change at any time and that levels of funding for various programs may vary from year to year.

College of Veterinary Medicine Loan-Scholarship Fund. This loan-scholarship fund was established from contributions to the college by alumni and friends. Income from the fund is offered annually as scholarship support for students with financial need.

Stephen Arnold Memorial Scholarship. In 1988, friends, clients, and classmates of Stephen Arnold, D.V.M. '74, established this scholarship in his memory to make funds available to students pursuing careers in veterinary medicine.

Auxiliary to the New York State Veterinary Medical Society Scholarship. Two scholarships are awarded each year, one to a student at the end of the second year and the other available to any student. The award of these scholarships will be based on the applicants' financial need and ability to do creditable academic work. Additional awards may be made as funds are available.

Auxiliary to the Long Island Veterinary Medical Association Scholarship. An annual gift from the auxiliary to the L.I.V.M.A. provides a scholarship award for an outstanding, needy student in each year's second-, third-, and fourth-year class.

Harriet G. Bird Memorial Scholarship. Established by the Merwin Memorial Free Clinic for Animals for Massachusetts residents. The award is based primarily on the financial need of applicants who maintain satisfactory academic performance.

The Bloch Family Scholarship. A scholarship established in 1990 by Jack Bloch, D.V.M. '60, in memory of his parents, David and Thekla Bloch.

The Joseph Brender Student Aid Fund. Established by friends of Joseph Brender, this memorial fund provides income for an annual scholarship award to veterinary students, with preference given to ethnic minority students.

James D. Brenneman '77 Memorial Scholarship. Family, friends, and classmates of Dr. Brenneman established this scholarship in his memory in 1991, shortly after his death. Awards are made to students in financial need.

The Dorsey W. and Beatrice C. Bruner Scholarship. This endowed scholarship for veterinary students was established in 1990 in memory of Mrs. Beatrice Bruner, wife of Professor Emeritus Dorsey W. Bruner, and her lifelong interest in veterinary students.

Central New York Junior/Amateur Horse Show Scholarship. This fund was established in 1990 by the Canterbury Riding Club and Pony Pals, two 4-H clubs from Onondaga County, with the proceeds earned over 10 years from the jointly sponsored Central New York Junior/Amateur Horse Show. The scholarship will benefit a first-year veterinary medical student with previous 4-H experience or Central New York residence.

Charlie and Chico Memorial Scholarship. An award dedicated to the memory of two faithful companion dogs, established by Mr. and Mrs. Alfred Morra in 1979. The scholarship is designated for a veterinary student who is from Connecticut or the New England area. It is to be given to a student who exhibits special care and concern for small animals, has definite financial need, and maintains creditable academic performance.

The Dorothy R. Clay Scholarship Fund. This fund was established in 1981 from the Dorothy R. Clay estate and is designed to provide scholarship aid for veterinary students.

Veterinary College Class Scholarships. These funds have been established by D.V.M. alumni classes to provide assistance to today's veterinary medical students at Cornell:

Class of 1929 Scholarship. Established in 1992 by the surviving members of the class to benefit veterinary students needing financial assistance.

Class of 1941 Scholarship. Established in 1991 at the time of the class's 50th reunion.

Class of 1942 Scholarship. Established in memory of Dr. Peter Olafson in 1992 at the time of the class's 50th reunion.

Class of 1945 Scholarship. Established in 1990 at the time of the class's 45th reunion.

Class of 1946 Scholarship. Established in 1991 at the time of the class's 45th reunion.

Class of 1950 Scholarship. While they were students, most of the members of the Class of 1950 were married and had children. They established this scholarship in 1990 at the time of the class's 40th reunion, to be awarded with a preference for married students with children.

Class of 1951 Scholarship. Established in 1991 at the time of the class's 40th reunion.

Class of 1952 Scholarship. Established in honor of Dr. Stephen J. Roberts '38 and Dr. John Bentinck-Smith '44 in 1992 at the time of the class's 40th reunion. Awards will be made to students who have good academic standing and have demonstrated financial need.

Class of 1956 Scholarship. John Shumway, D.V.M. '56, provided the initial gifts to establish this award. With his leadership and gifts from other members of the Class of 1956, the fund is growing to provide assistance for today's veterinary medical students.

Class of 1957 Memorial Scholarship. Dedicated to the memory of deceased classmates, family, and friends, this scholarship was established in 1992 at the time of the class's 35th reunion. Preference will be given to veterinary student descendants of the Class of 1957 who demonstrate financial need.

Class of 1960 Scholarship. Established in 1990 at the time of the class's 30th reunion.

Class of 1961 Scholarship. Established in 1991 at the time of the class's 30th reunion.

Class of 1962 Scholarship. Established in 1992 at the time of the class's 30th reunion.

Class of 1965 Scholarship. Established in 1990 at the time of the class's 25th reunion.

Class of 1967 Scholarship. Established in 1992 at the time of the class's 25th reunion.

Class of 1970 Scholarship. Established in 1990 at the time of the class's 20th reunion.

Class of 1972 Scholarship. Established in 1992 at the time of the class's 20th reunion.

Class of 1974 Scholarship. This fund began in 1984 with gifts contributed in memory of Mark Chamberlin, D.V.M. '74, by his classmates and friends. The class intends to continue gifts to this scholarship in his memory and in honor of others.

Class of 1976 Scholarship. Established in 1991 at the time of the class's 15th reunion.

Class of 1977 Scholarship. Dedicated to the memory of their deceased classmates, this scholarship was established in 1992 at the time of the class's 15th reunion.

The Marjorie Dean Cornell Scholarship in Feline Medicine. This scholarship was established in 1986 by Marjorie Dean Cornell '39 to encourage women studying veterinary medicine who show special interest in feline medicine.

The Ben B. and Elizabeth Cox Scholarship. An endowment established in 1986, this scholarship is to be awarded to students of high character, strong academic record, and demonstrated financial need.

The William A. and Walter R. Dennis Memorial Loan-Scholarship Fund. In 1981 Walter R. Dennis, D.V.M. '38, endowed a fund in memory of his brother, William A. Dennis, D.V.M. '26, to benefit second-, third-, or fourth-year students interested in the practice of farm animal medicine, with preference for students from Cattaraugus, Chautauqua, Chenango, and Madison counties. Following the death of Walter R. Dennis, the college honored a request from his family that the fund be known as the William A. and Walter R. Dennis Memorial Loan-Scholarship Fund.

Duncan Memorial Scholarship. An award dedicated to the memory of a faithful dog, and also recognizing two consummate professionals—Dr. Robert Aldrich of New Haven, Connecticut, and Dr. Melvyn Pond of Madison, Connecticut—through whose efforts the life of this animal was both prolonged and enriched. Established by Mr. and Mrs. Alfred Morra in 1991, this scholarship is given with preference to a veterinary student who is a resident of Connecticut.

The Dr. John W. and Vivian M. Earl Scholarship. An endowed scholarship established by John W. Earl, D.V.M. '38, for veterinary students who have demonstrated their worthiness through their academic achievements.

Priscilla Maxwell Endicott Scholarship. This endowed scholarship was established in 1977 in honor of Niel W. Pieper, D.V.M. '32. The income is to be used primarily for support of Connecticut students and is awarded on the basis of creditable academic performance, personal attributes, and financial need. If the scholarship is not needed for Connecticut students, it may be used for students from other New England states.

Equine Summer Experience Scholarship. Established to offer increased experience to students interested in equine practice, this scholarship is supported by organizations in the equine industry and by equine veterinary practitioners.

Myron G. Fincher Memorial Scholarship Fund. Funds from this scholarship will be used to provide assistance to outstanding third- or fourth-year students enrolled in the College of Veterinary Medicine at Cornell. Preference will be given to students who are interested in careers in the practice of large animal medicine or in academic large animal medicine.

The Francis H. Fox Scholarship. This endowed scholarship was established in 1990 in recognition of Dr. Fox's outstanding contributions to veterinary medicine as a teacher and clinician and his friendly ability to counsel students and alumni throughout their professional careers. The scholarship will be awarded to support a second- or third-year student with financial need who demonstrates interest in large animal medicine and surgery and an aptitude for physical diagnosis.

Glens Falls Kennel Club Scholarship. An annual scholarship established in 1990 with a gift from the Glens Falls Kennel Club, to be awarded to a third- or fourth-year veterinary student from the tri-county (Warren, Washington, Saratoga) area.

Sheila D. Grummick Scholarship. This endowed scholarship was established in 1990 and is awarded to female students enrolled in the College of Veterinary Medicine.

Arthur G. Hall Scholarship. Established in 1975 as an endowed scholarship for needy and worthy students who maintain the moral standards required by the rules and regulations of the college.

Richard M. Hartenstein Scholarship. This scholarship is awarded by the Auxiliary of the Long Island Veterinary Medical Association to an outstanding veterinary student from Long Island, in memory of Richard M. Hartenstein.

The Billy Haughton Memorial Scholarship. Friends and relatives of Billy Haughton, one of the leading driver-trainers in harness horse racing, established this scholarship following his death in 1986. Billy Haughton was a long-time friend and adviser to the college's equine programs, and thus the scholarship is awarded with a preference for students with strong interests in careers in equine medicine.

Hill's Pet Products Scholarships. A program developed by Hill's Pet Products to provide a scholarship for each veterinary class. The awards are based on financial need and special interest in small animal clinical nutrition.

Jaqua Scholar Program. The Jaqua Foundation provides annual funding for one or two awards on the basis of academic standing, financial need, and New Jersey residence. The awards are designed for recipients who typify the foundation's concerns and objectives for animals as personal companions and for their humane care in research programs.

David Kennedy Johnston Scholarships. Under the will of Nettie J. Huey, funds were set aside to provide scholarships to students in the College of Agriculture and Life Sciences and the College of Veterinary Medicine.

Dita and Frances J. Koppstein Scholarship. Established in 1992 from the Dita Koppstein estate. Awards will be made to worthy veterinary students in need of financial assistance.

Madelyn C. Kreisler Scholarship. Established in 1977 from the Madelyn C. Kreisler estate to provide scholarships in veterinary medicine.

Le Schin-Wieler Empire Cat Club Scholarship. This endowment was established in 1986 by the Le Schin-Wieler Cattery in honor of Eberhardt E. Le Schin and John W. Wieler. Recipients are selected from the entering class who show academic worthiness and financial need and who have an interest in small animals, preferably cats.

Joel Rosenman Leventhal Memorial Scholarship. The Joel Rosenman Leventhal Scholarship was established in 1983 as a gift from Miriam R. Leventhal in memory of her son, whose greatest aim in life was to be a veterinarian and who was a student at Cornell University when he met with a fatal accident. This scholarship is to be awarded with the expectation that the student who receives it during the first year in the College of Veterinary Medicine will continue to be supported. It is for a veterinary student who completed undergraduate work at Cornell University.

Germaine B. Little Student Loan Fund. This loan-scholarship fund was established by the will of Germaine B. Little.

Miles C. Markham Scholarship. This endowed scholarship was established in 1976 in honor of Miles C. Markham, D.V.M. '18, by his wife, Hedwig, for worthy, needy students in the college.

Dr. Lykergus W. and Alma Fay Messer Memorial Scholarship. A bequest from the estate of Alma Fay Messer established this scholarship in 1981 in honor of her husband, Lykergus W. Messer, D.V.M. '28.

North Shore Animal League/Petring Scholarship Fund. The North Shore Animal League received a bequest, in the names of Anita and Catherine Petring, for scholarships for aspiring veterinary students. The outstanding reputation of the College of Veterinary Medicine at Cornell University prompted the league to select it as one of the recipients of this scholarship program.

North Shore Animal League Scholarship-Loan Fund. An endowment provided by the North Shore Animal League in 1983 to be used for scholarship support of veterinary students, with preference for those having small animal interests.

Pfizer Scholarship. This scholarship is awarded to a student at the end of the third year who has clear need for financial support, has a creditable academic achievement, and shows good potential.

Plainfield Kennel Club Scholarship. This is an award for a veterinary student from New Jersey in need of financial assistance.

Mrs. Cheever Porter Foundation Scholarship. Supportive of organizations working with animals, the Mrs. Cheever Porter Foundation endowed this scholarship in 1982.

Wilburn H. and Florence Bean Potter Scholarship. Wilburn H. Potter, D.V.M. '18, and Florence Bean Potter dedicated their lives to improved rural living, the practice of bovine veterinary medicine, and applied dairy cattle husbandry on their farm. Members of the Potter family, joined by many friends, established this scholarship fund in 1986 to encourage students at the College of Veterinary Medicine at Cornell considering careers in bovine medicine. Preference is given to graduates of the College of Agriculture and Life Sciences and Cortland County residents.

Ryman and Katherine Powell Student Fund. This fund was established by two veterinarians, Frank Powell, D.V.M. '63, and Josef Powell, D.V.M. '67, in honor of their parents. Earned income from this endowment is awarded annually with preference given to students from western New York State.

Putnam Kennel Club Scholarship. The club provides scholarship support for a deserving veterinary student from New York State whose major interests are in the small animal area.

Merlin H. Reed Memorial Scholarship. A gift from Ms. Lois Reed established this scholarship in memory of her brother, Merlin H. Reed, for a third-year student with a strong academic record, demonstrated financial need, and special interest and concern for small animals. Preference will be given to students from the northeastern area of New York State.

Dorothy S. Rex Student Aid Fund Scholarship. This endowment fund, established in 1979 by the Dorothy S. Rex estate, is designed to help educate worthy young men and women in veterinary medicine.

Salsbury Scholarships. An endowment from the Dr. J. E. Salsbury Foundation to provide funds for senior veterinary students. The awards are based on scholarship, initiative, perseverance, leadership potential, and financial need.

The Dorothy Schiff Scholarship. The Dorothy Schiff Foundation awarded the College of Veterinary Medicine a grant in 1990 to establish a scholarship in memory of Dorothy Schiff for her commitment and dedication to companion animals.

Sewell-Metzger Memorial Scholarship. An endowment provided in 1980 by the will of Dorothy Metzger is to be used for scholarship support of veterinary students who have completed three years of academic training and have demonstrated interest in small animal research, especially for the canine species.

Thomas F. Tanneberger Memorial Scholarship-Loan Fund. A fund established by the veterinary class of 1975 in memory of Thomas F. Tanneberger, D.V.M. '75, for veterinary students who have made outstanding athletic contributions during their lifetimes, with preference for those from the northern New York area.

The Jim Dale Thomas Memorial Scholarship. This award was established as a prize in 1965 and became a scholarship in 1969. The scholarship is awarded to a third-year veterinary student who has shown an interest in dairy cattle practice and has a high level of capability in this field.

Union County Kennel Club Scholarship. A scholarship for a third- or fourth-year veterinary student from New Jersey.

Dr. Donald B. Wade Memorial Fund Scholarship. An endowment established in honor of Donald B. Wade, D.V.M. '70, for a veterinary student who displays academic excellence and needs financial assistance. Preference is given to students from Vermont or those who plan to practice in Vermont.

Hilda G. and Walter D. Way Scholarship. A scholarship established in 1984 to help a needy and deserving veterinary student.

Westminster Kennel Foundation Scholarship. The Westminster Kennel Foundation established this annual scholarship in 1987 to assist a worthy veterinary student who expresses an interest in the welfare of the dog. The recipient is invited, at the expense of the foundation, to attend the Westminster Kennel Club show.

Hulda Ann White Scholarship. This endowment was provided in 1984 by the will of Hulda Ann White, who was a lover of animals and wanted to benefit the College of Veterinary Medicine. Hulda White bequeathed a scholarship "to be used for the education of veterinarians for the health and welfare of all animals."

Virginia B. Wuori Memorial Scholarship. This scholarship was established by Virginia Wuori in appreciation of the meaningful and rewarding relationships she had with many veterinary students and the profession for a great number of years.

Wyoming Valley Kennel Club Scholarship. A scholarship for veterinary students in the third- and fourth-years who need financial assistance and who come from the western New York counties of Allegheny, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans, and Wyoming.

Yonkers Raceway Foundation Scholarship. By action of the executive committee of the Yonkers Raceway Foundation, an endowed scholarship was established at the College of Veterinary Medicine to be awarded to a needy student who is a resident of New York State.

Dr. Irving Zimmerman '35 Memorial Scholarship. This scholarship was established in 1986 by Dr. Irving Zimmerman's family. It is to be awarded to a student who demonstrates a special interest in and aptitude for veterinary pathology, as determined by the faculty of that department.

Awards and Prizes for Veterinary Students and Faculty

Numerous prizes and awards, some established with endowments, are available to veterinary students and are subject to specific criteria listed in the annual Honor Day brochure. The following awards and prizes are presented at the college's annual Honor Day Banquet held each spring.

Fourth-year Students

The American Animal Hospital Association Student Award for proficiency in small animal medicine and surgery.

The American Association of Feline Practitioners Award for proficiency in feline medicine and surgery.

The American College of Veterinary Surgeons Award for outstanding motivation and interest in veterinary surgery.

The Anne Besse Prize for the best work in large animal medicine.

Prize of the Auxiliary of the American Veterinary Medical Association for extracurricular contributions designed to advance the standing of the College of Veterinary Medicine on campus.

The James Gordon Bennett Prize for greatest humaneness in handling animals, with special reference to the use of anesthesia.

The Frank Bloom Pathology Award for special excellence in pathology.

The Gary Bolton Memorial Cardiology Award for understanding and expertise in cardiology and demonstrated empathy for patients.

The Charles Gross Bondy Prize for the best work in courses in practical medicine and surgery of small animals.

The A. Gordon Danks Large Animal Surgery Award for outstanding knowledge and talent in the diagnosis and treatment of surgical problems of large animals.

The Donald D. Delahanty Memorial Prize for interest and proficiency in equine practice.

The Myron G. Fincher Prize for the best academic and practical performance in courses dealing with large animal obstetrics and reproductive diseases.

The Gentle Doctor Award for enthusiasm, motivation, and dedication to the delivery of excellent veterinary patient care.

The Hill's Awards for Excellence in Clinical Nutrition (3) for students who submitted the best essays or case reports describing the role dietary management played in the care of a patient.

The Impromed Prize for proficiency in the art and science of small animal diagnosis.

The* Merck Manual *Awards (2). The basis of the award varies from year to year and is determined by the assistant dean for student services.

The Malcolm E. Miller Award for perseverance, scholastic diligence, and other personal characteristics that will bring distinction to the veterinary profession.

The Neuroanatomy-Clinical Neurology Prize for outstanding expertise and interest in neuroanatomy and clinical neurology.

The New York State Veterinary Medical Society Prize for the best senior seminar.

The Purina Mills Award for Proficiency in Swine Medicine for excellence in the practice of swine medicine.

The Colonel Floyd C. Sager Equine Obstetrics and Pediatrics Award for aptitude in equine obstetrics and pediatrics.

The E. L. Stubbs Award for competence and motivation in various areas of avian medicine.

The Jacob Traum Award for interest and accomplishment in bacteriology, epizootiology, pathology, and virology, and aptitude for, and expressed interest in, research on infectious diseases.

The Upjohn Clinical Awards (2) for proficiency in large and small animal medicine.

The Horace K. White Prize for the highest academic record during the entire curriculum.

The Wild Bird Research and Rehabilitation Award for the student who has demonstrated concern for the rehabilitation of wild birds or who has been involved in research related to wild bird treatment and rehabilitation.

The Pharmacology Faculty Prize for outstanding performance in pharmacology.

The Grant Sherman Hopkins Prize for interest, ability, perseverance, and performance in anatomy.

Third-year Students

The P. Philip Levine Prize in Avian Medicine for the highest grade in the course on avian medicine.

The Anna Olafson Sussex Pathology Award for excellence in pathology.

Second-year Students

The Jane Miller Prize for the best work in physiology.

The Phi Zeta Award for the best academic record on completion of the first three semesters of study.

The Mary Louise Moore Prize for excellence in bacteriology.

The Ettinger Incentive Award for the student who has made the greatest improvement in cumulative GPA between the earlier and the third semesters.

All Students

The Hugh Dukes Prize in Experimental Physiology for the individual who has done excellent work in physiology laboratory courses and shows potential for teaching and contributing new knowledge to physiology.

The Iams Prize for students who submit the best essay on an assigned topic.

The Philotherian Photographic Prizes for student photographs. The prizes are awarded on the basis of individuality of the animal, its enjoyment of its surroundings, and the emotive qualities it evokes.

Faculty Awards

The Beecham Award for Research Excellence for research achievement likely to have a significant impact on our understanding of the biology or medical management of animals.

MSG (Merck) AgVet Award for creativity in teaching.

The Norden Distinguished Teacher Award for demonstrated continued excellence in teaching.

SAVMA Award for teaching excellence.

External Awards

George C. Poppensiek Professorship in International Medicine. This professorship was named in honor of George C. Poppensiek, dean of the college from 1959 to 1974. Established in 1988, it is awarded each year to a veterinarian from outside North America. The recipient is invited to give a general lecture and a series of seminars and meetings with faculty and students. The object of the professorship is to expand understanding of veterinary medicine in other countries and broaden the horizon of the North American veterinary community. The International Advisory Committee is charged with identifying nominees.

The James Law Distinguished Lecturer Series. Named after the first dean of the college and first professor of veterinary medicine at Cornell, the James Law Distinguished Lecturer Series was established in 1980. The lecture series emphasizes contemporary achievements in the field of biomedical sciences while introducing to the community a number of renowned scientists and scholars who are leaders in their fields.

Student Life

Housing and Dining

Off-Campus Housing

Most veterinary medical students live off campus. Students should plan to visit Ithaca well in advance of registration if they wish to obtain quarters off campus. Information on housing is available at the Off-Campus Housing Office, 103 Barnes Hall. The college Office of Student Services also maintains lists of housing suitable for veterinary students.

On-Campus Housing

The graduate residences are conveniently situated and provide a comfortable multicultural atmosphere for study, recreation, and socializing. The new Maplewood Park apartments, near the College of Veterinary Medicine on the southeast side of campus, house 308 single graduate students and 90 student families. Schuyler House, located in a residential area within walking distance of campus and downtown shopping areas, accommodates 140 graduate men and women. Two small coeducational residences, 112 Edgemoor and The Oaks, are situated on the west side of campus and together house approximately 70 graduate students. Thurston Court, a small apartment building situated on the north side of Fall Creek Gorge, accommodates 21 students.

Room assignments are made in the order in which applications are received. The housing contract for Maplewood Park and Thurston Court apartments is for a 12-month period beginning August 15. In the other graduate residences, the contract period is for the academic year. Requests for information and applications should be directed to the Housing Assignment Office, 1142 North Balch Hall, Ithaca, New York, 14853-1401 (telephone: 607-255-5368).

Student Family Housing

The university maintains apartments for approximately 420 student families in three different complexes. Hasbrouck and Pleasant Grove apartments, located on the north side of campus, have one- and two-bedroom unfurnished apartments. The family units in Maplewood Park are furnished and have one bedroom and a study. Requests for further information and applications should be directed to the Student Family Housing Office, Cornell University, 40 Hasbrouck Apartments, Ithaca, New York 14850-2662 (telephone: 607-253-5333).

Dining Services

Breakfast and lunch are available in the cafeteria in the Veterinary Research Tower. Vending machines are also located at various places throughout the college.

Those students who plan to live on campus may choose to participate in the Co-op dining program. Additional information on the various plans available may be obtained from Cornell Dining, 233 Day Hall (telephone: 607-253-8582).

The Big Red Barn, a dining and social center for graduate and professional students, is centrally located near Bailey Hall. For current hours and services, telephone 254-GRAD.

Activities and Organizations

SCAVMA

Most students belong to the Student Chapter of the American Veterinary Medical Association (SCAVMA). Membership benefits include a subscription to JAVMA *(Journal of the American Veterinary Medical Association)*; a voice in the national organization, SAVMA (Student American Veterinary Medical Association); and participation in activities throughout the year. SCAVMA sponsors lectures, wet labs, and social events including picnics for incoming first-year students and for graduating seniors. Fund-raising activities include an annual auction, dog washes, and the selling of veterinary school T-shirts and hats. A yearly service project is helping the county with its rabies clinic. In the spring, many students attend the national SAVMA symposium, which is held at a different school of veterinary medicine each year. Cornell Chapter of SCAVMA officers for 1992-93 are: president–Emily Thall, '94; vice president–Elizabeth Nichols, '94; secretary–Nicole Northrup, '94; treasurer–Jeffrey Walcoff, '94; faculty adviser–Thomas J. Divers.

Other Organizations

Students with special interests can also join one of many other organizations active in the college. Each of these groups meets to discuss its particular interests and sponsors lectures, trips, and workshops. Currently, the groups represented at the college are Association of Avian Veterinarians, American Association of Equine Practitioners, American Association of Bovine Practitioners, American Association of Zoo Veterinarians, American Animal Hospital Association, American Association of Feline Practitioners, Association of Veterinarians for Animal Rights, Research-Oriented Veterinary Students, and Multi-Ethnic Veterinary Student Association. Students also are members of the following college committees:

Faculty-Student Liaison Committee

Honor Board

Financial Aid Advisory Board

Student Curriculum Committee

Common Environment Committee

Open House

Each year, students at the college participate in the planning and presentation of Open House. On a Saturday in April the college is opened to several thousand members of the public and offers displays and exhibits, tours, films, and instruction on many aspects of veterinary medicine directed toward various age groups.

Honor Societies

There are three honor societies for which students of the College of Veterinary Medicine are eligible.

Phi Zeta: Founded in 1925 by the veterinary students at Cornell University, Phi Zeta strives for the constant advancement of the veterinary profession, higher educational requirements, and superior scholarship. The object of the society is to recognize and promote scholarship and research pertaining to the welfare and diseases of animals.

Sigma Xi: Any student or research staff member is eligible for membership in Sigma Xi, the Scientific Research Society of North America. It is the responsibility of the Admission Committee of Sigma Xi to select for membership those individuals whose research aptitude or achievement deserves special recognition.

Phi Kappa Phi: The society of Phi Kappa Phi was founded in 1897 and soon became a national organization. Its primary objective is to recognize and encourage superior scholarship in all fields of study. Good character is essential for those elected to membership.

Fraternities

Alpha Psi and Omega Tau Sigma have houses in Ithaca. These veterinary fraternities are coeducational and encourage all students to join whether or not they live at the house.

Academic and Personal Counseling

Each student has an academic adviser to assist with questions concerning academic progress and career goals within the profession. In addition, the college Office of Student Services provides assistance in resolving academic problems and personal difficulties that affect students' achievement. Workshops to improve study and test-taking skills and time management are offered. Individual consultation regarding personal adjustment and stress management is also available through the Office of Student Services.

Health Services

The Department of University Health Services provides medical care for all full-time undergraduate and graduate students enrolled at Cornell University in Ithaca. Gannett Health Center, at 10 Central Avenue, is open 24 hours a day during the school year and is available for overnight care and urgent outpatient services outside of normal working hours. Normal hours are Monday through Friday from 8:30 a.m. to 11:30 a.m.; 1:00 P.M. to 4:30 p.m.; and Saturday from 8:30 a.m. to 12:00 noon during regular academic terms.

The center's medical staff, under the supervision of the medical director, consists of attending physicians and health associates from the university staff and consulting physicians and surgeons from the Ithaca area. All medical records are strictly confidential.

For a medical appointment, a student should call 255-6958 or go to the center. For an appointment with Psychological Services, a student should call 255-5208 or go to the offices at the center. A doctor is on call for urgent problems 24 hours a day (telephone: 255-5155).

General medical care, psychological services, gynecological care, and overnight and after-hours care are provided at Gannett Health Center without additional cost. There may be a charge for laboratory service, radiographs, physical therapy, limited consultations, allergy shots, drugs, and other services provided on-site. There is a fee for all services off-site. Students may call 255-4082 for additional information.

Student Accident and Sickness Insurance Plan

Cornell sponsors a health insurance plan underwritten by a private insurance company to supplement the services outlined above. This plan may be waived if the student has other health insurance or is willing to accept the financial risk of no insurance. The university plan does not cover preexisting conditions. Students are urged to consider carefully the comprehensive benefits available for a relatively modest fee before waiving the plan. The plan covers most services available at the center for which a fee may be charged. It also covers services not available on campus, such as hospital care and consultations. Further, it provides for expenses relating to illness or accidents outside Ithaca during the academic year and vacation periods. Families of students are eligible for coverage and most enroll annually. Information about this insurance may be obtained by calling 607-255-6363 or by visiting Gannett Health Center, where a representative of the insurance company has an office.

Health Care Plan for Student Spouses

The University Health Services provides health care for student spouses on a prepaid or fee-for-service basis. The fee schedule and other information about this service are available at the front desk and in the Student Insurance Office.

Emergency Health Service

Students requiring after-hours or urgent care should call the health center at 255-5155 to receive instructions on the proper course of action to follow.

Conduct of Students

The standards of conduct expected of a Cornell University veterinary student are defined by various university regulations and by the College of Veterinary Medicine Student Honor Code. The code was established in recognition of the importance of ethics, honor, and integrity in an individual's training for the profession. It places the responsibility for ethical and professional conduct on the students and is implemented by the Student Administrative Board, which is granted initial jurisdiction by the faculty. It is each student's responsibility to become familiar with the contents of the code and to abide by it throughout his or her involvement with the college.

Placement

The placement service, a part of the Office of Student Services, C-106 Schurman Hall, offers valuable information to students attending the College of Veterinary Medicine at Cornell. Alumni and other practitioners seeking associates also benefit from this service.

Employment opportunities for permanent positions, summer jobs, and externships, solicited from all over the country, are stored on a central computer and accessed by remote terminal. Type of practice (small, large, or mixed) and desired geographic location can be selected and viewed on the screen or printed on a remote printer in the student services office.

Workshops on writing résumés, job applications, salary negotiation, and the purchase of insurance; compilation of national and state board information; and the collection and distribution of employment statistics are additional services provided by the Office of Student Services.

Services for Persons with Disabilities

Cornell University is committed to assisting those persons with disabilities who have special needs. A brochure describing services for persons with disabilities may be obtained by writing to the Office of Equal Opportunity, Cornell University, 234 Day Hall, Ithaca, New York 14853-2801. Other questions or requests for special assistance may also be directed to that office.

Legal Requirements to Practice

Before graduates can practice veterinary medicine in the United States, they must obtain a license from the state or states in which they locate their practices. This license is generally issued by the department of education or the department of agriculture of the state on the basis of an examination by a veterinary licensing board. Some states issue licenses without examination, based upon reciprocity, when the applicant has been licensed in other states.

The licensing agency in New York is the State Education Department. Application for the examination must be filed at least 60 days before the scheduled date. Information about fees and all inquiries should be addressed to the Executive Secretary of the State Board for Veterinary Medicine, Room 3041, Cultural Education Center, Albany, New York 12230.

Summer Programs and Opportunities

D.V.M. Students

International Projects

The International Advisory Committee makes funds available on a competitive basis to D.V.M. students who are interested in becoming involved in veterinary projects in developing countries. All D.V.M. students in good academic standing are eligible to apply. Proposals for international projects must include a description of the project, personal background, interest in work overseas, language ability, a realistic budget, and plans for sharing the experience with the college community. The deadline for submission is the end of February. Decisions are made by the International Advisory Committee and funds are administered by the director of international programs.

NIH Summer Research Fellowships

As part of a National Health Sciences Manpower Program, the National Institutes of Health has awarded the college a training grant designed to provide introductory research experience for veterinary students during the summer months. Students selected for the program will participate actively in a research program being carried out in one of several specific college research laboratories. For more information, contact Dr. Robert M. Lewis, Department of Pathology.

Academic Program Development

Employment opportunities are available on a competitive basis to students interested in assisting faculty in the development of course materials for the D.V.M. curriculum. Specific projects include developing problem-based case tutorials and computer-assisted learning modules. For more information, contact Dr. Donald Smith, associate dean for veterinary education.

Leadership Training Program for Veterinary Students

For the past three years, the College of Veterinary Medicine at Cornell has hosted a Leadership Training Program for Veterinary Students. The program targets gifted students from Cornell and other veterinary colleges who aspire to leadership positions in academic institutions, government, or industry. Major objectives of the program are to acquaint the participating students with career opportunities for veterinarians, to assist them in planning their professional activities, and to establish a network that will encourage interaction among students later in their careers.

Successful applicants for admission to the program are awarded fellowships that enable them to spend 10 weeks at Cornell during June, July, and August. Student fellows engage in faculty-directed research and take part in a variety of professional enrichment activities that have been selected for their excellence and relevance to the program. Features of the program include a $3,250 honorarium, free in-residence housing, research experience, seminars and group discussions, a daylong visit to the research facilities of Merck Company, and a daylong program that features career counseling. The 1992 program also featured a two-day visit to the National Institutes of Health and the United States Department of Agriculture's research facilities in the Washington, D.C. area.

Application forms for admission to the 1993 program may be obtained by writing to Ms. Linda A. Griswold, Graduate Education Coordinator, College of Veterinary Medicine. The deadline for applications is January 4, 1993.

College Students

Summer Employment Opportunity Program for Minority College Students

This eight-week program in the College of Veterinary Medicine provides an opportunity to obtain knowledge about veterinary college admissions requirements and to gain animal-related experience. Students are eligible to attend this program if they have a demonstrated interest in a career in veterinary medicine and have completed some of the course work required for admission to the veterinary program at Cornell. Students who identify themselves as African American, Hispanic, Native American, Alaskan Native, or Pacific Islander and are enrolled in college during the academic year prior to the start of the program are eligible to apply. Application material and further information may be requested from Ms. Shenetta Selden, multicultural affairs coordinator.

Pre-D.V.M. Advanced Pharmacology Training Program

The Department of Pharmacology makes funds available for a summer program in basic or clinical pharmacology. Students are selected on the basis of academic qualifications and potential interest in a career in pharmacology. Training, which will be for two or three successive summers, is in basic or clinical pharmacology, pharmacokinetics, or toxicology. Students may work in a different area each summer. The work will be structured to provide formal reading, study, and research under the personal supervision of a faculty member. The major goal of this program is to encourage highly talented individuals to enter a career of veterinary pharmacology. The current summer stipend is $2,500. Interested students should contact Dr. Geoffrey W. G. Sharp, chair, Department of Pharmacology, on or before April 15.

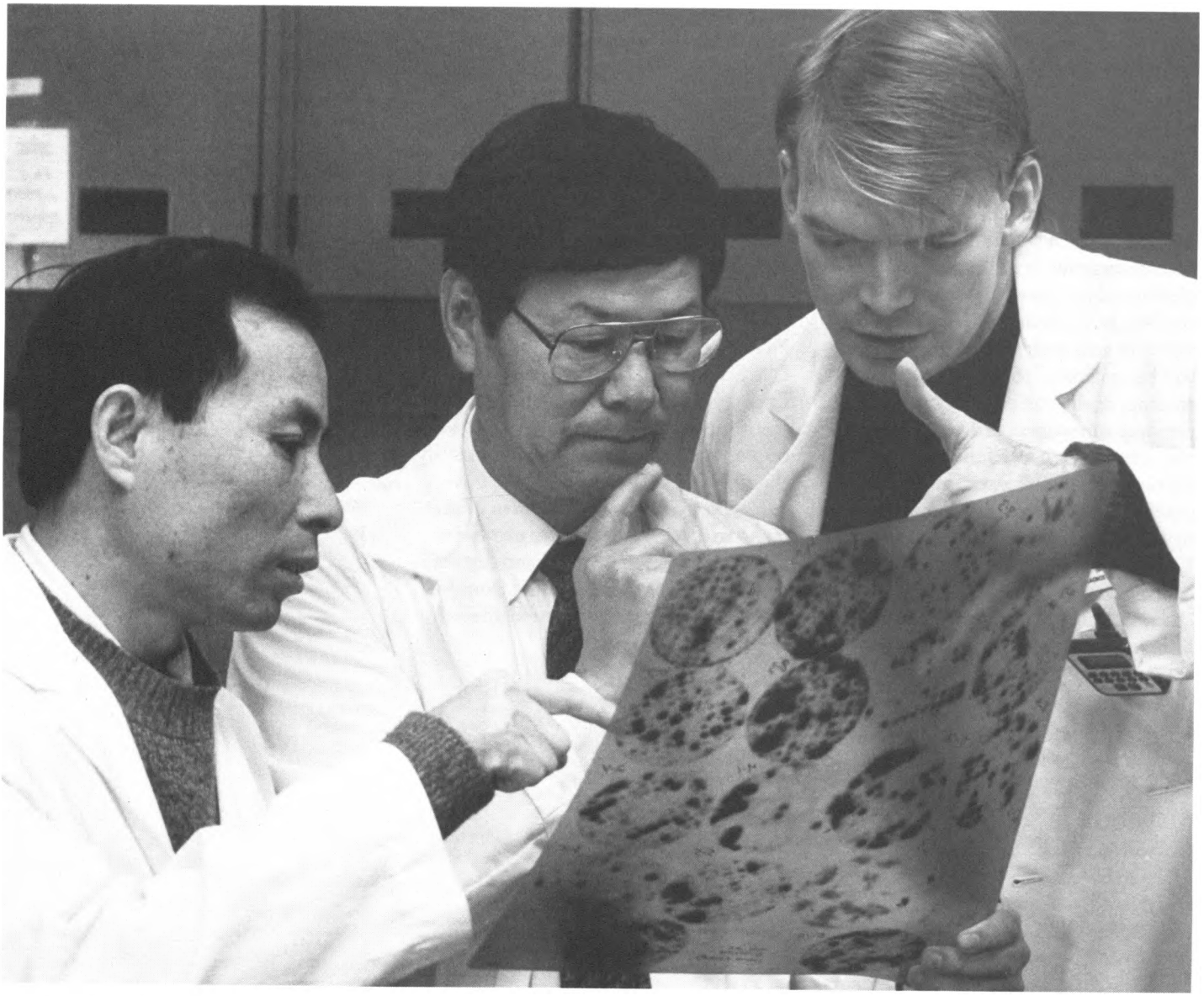
Research Apprentice Program for Minority High School Students

The purpose of this six-week program is to stimulate in students an interest in pursuing careers in biomedical research. Students are assigned to investigators who are committed to developing in high school students both an understanding of the research in which they participate and the technical skills involved. Students are also assigned to other colleges and units at Cornell including the College of Agriculture and Life Sciences, the College of Human Ecology, and the Boyce Thompson Institute. Students who are U.S. citizens or permanent residents and who identify themselves as African American, Hispanic, Native American, Alaskan Native, or Asian/Pacific Islander are eligible to apply. Application material and further information may be requested from Ms. Shenetta Selden, multicultural affairs coordinator.

High School Students

Explorations in Veterinary Medicine

Cornell University Summer College offers a six-week program for high school students interested in gaining realistic insights into modern veterinary medicine. Through lectures, laboratories, visits, and demonstrations, students become acquainted with the wide range of disciplines within the profession. Students have the opportunity to meet current veterinary students and faculty involved in a variety of research and clinical programs. In addition, participating students take a freshman writing course and choose one or more courses from those offered by Summer College. Students successfully completing the program receive a certificate from Cornell University Summer College. For more information, write to Cornell University Summer College, Box 725, B12 Ives Hall, Ithaca, New York 14853-3901, or call 607-255-6203.



Microbiology is one of several graduate fields of study offered at the college. Here, in the Diagnostic Laboratory, an *E. Coli* DNA probe is analyzed.

The Graduate School

Graduate Education

Graduate education at the College of Veterinary Medicine is administered by the Graduate School, located at Sage Graduate Center. Students who hold a baccalaureate or equivalent degree may apply for admission to the Graduate School with a view to pursuing graduate studies leading to the M.S. or Ph.D. degree.

Graduate education at Cornell is organized by Field of Study as opposed to discipline or department. The graduate fields of Veterinary Medicine, Physiology, and Immunology are the most highly represented in the College of Veterinary Medicine. On occasion, however, students find it expedient to enroll in other graduate fields such as Animal Science, Biochemistry, Environmental Toxicology, Microbiology,

Neurobiology and Behavior, Nutrition, or Zoology. Each graduate field contains several areas of concentration. A description of each field, including its individual requirements and areas of concentration, is contained in the current Graduate School catalog and in *Peterson's Guide to Graduate Programs in the Biological, Agricultural, and Health Sciences.*

Combining the Professional (D.V.M.) and Graduate (Ph.D.) Degrees. A combined D.V.M./Ph.D. program is offered by the College of Veterinary Medicine and the Graduate School. The program targets highly qualified students who aspire to an academic career. Students pursuing the combined degrees register in the Graduate School during summer vacation periods to obtain residence credits toward the Ph.D. degree. With proper planning, it is possible to complete the D.V.M./Ph.D. in six calendar years, although students typically take longer to complete their training.

Before a student can be considered as a combined-degree candidate, he or she must be accepted into the professional degree program. Therefore, the first step is application to the Office of Admissions, College of Veterinary Medicine, Cornell University. When the student has enrolled in the veterinary college, application can be made to the Cornell Graduate School. Additional information about the admission process can be obtained from the graduate education coordinator at the address given at the end of this section.

Combined-degree candidates major in a concentration within the field of their choice. The student's major professor must be a member of the graduate faculty of the student's field as well as a member of the College of Veterinary Medicine.

First-year veterinary students with superior academic records and demonstrated research interests are encouraged to apply for admission to the combined program. Qualified applicants will be admitted only if the funding and research resources are available. Students are encouraged to express their interest in the combined-degree program at least six months before they register in the Graduate School. A student cannot be registered in both the College of Veterinary Medicine and the Graduate School at the same time; however, students may register in the college during the fall and spring terms and then register in the Graduate School during the summer semester. By doing so, students can earn 1/2 residence unit each summer semester up to a maximum of two units. After the veterinary degree is awarded, the student may petition the Graduate School to transfer two additional residence units for their time spent in the D.V.M. program. At least two residence units must be earned by full-time graduate study.

Special Programs in Graduate Education. Two new programs have been organized in the College of Veterinary Medicine: the Graduate Program in Cellular and Molecular Medicine and the Graduate Program for Veterinary Clinician Scientists. The new programs target exceptionally well qualified students who aspire to academic careers. They offer highly structured training experiences under the close supervision of faculty mentors who are nationally competitive research scientists. The programs are not linked to a single field or group of fields, and participation in them does not relieve students of their field obligations. Applicants for admission to the special programs must be accepted by the Cornell Graduate School and must remain in good standing in their graduate field.

Admission

Applicants are encouraged to communicate with one or more faculty members of the graduate field in which they are interested. These individuals may be identified by referring to the Graduate School catalog or communicating with the graduate faculty representative of the selected field. Applicants from countries outside the United States must submit a Test of English as a Foreign Language (TOEFL) score of 550 or greater if their native language is not English. This requirement applies to all fields.

Applications for admission to the Graduate School may be submitted any time; however, students who contemplate matriculation in the fall should submit their applications by March 1, and applications for spring matriculation should be submitted by October 1. Applications should be directed to the Graduate School, Sage Graduate Center, Cornell University, Ithaca, New York 14853-6201.

Financial Support

Most graduate students receive financial support from fellowships or graduate research/teaching assistantships. Seldom are students admitted to a graduate field without assurance that funding is available for the duration of their graduate studies.

Research assistantships and teaching assistantships are available from several sources: training grants, individual research grants and contracts, or by positions assigned to particular departments or operating units of the college. Approximately 20 assistantships are reserved for applicants with the D.V.M. degree. These are awarded annually following a college-wide competition, and are funded at a level comparable to that of other schools of veterinary medicine. The number of D.V.M. graduate assistantships awarded each year varies; however, two assistantships are reserved for the combined D.V.M./Ph.D. degree program. Fellowship support for up to three years is provided to students seeking the Ph.D. degree. Successful applicants who are newly enrolled in the Graduate School are provided an additional six months of support with the specific purpose of enabling students to rotate through three or more laboratories. The purpose of the rotation is to enable students to experience a variety of training opportunities before they designate their special committee chair.

During their D.V.M. studies, successful candidates for admission to the combined program will be assured of

financial support at current work-study rates when they conduct relevant research during intersessions and summer breaks. Course work will not be subsidized during these periods, however. Once students have been awarded the D.V.M. degree and are enrolled as full-time students in the Graduate School, they will receive tuition (currently worth $9,100 a year) and a minimum salary of $18,550 a year with yearly increments. Decisions on the awards are made in early spring of the year prior to fall matriculation. The deadline for submission of college D.V.M. graduate fellowship applications is December 14, 1992.

Graduate School fellowships are also available. These are awarded following a university-wide competition. Only the strongest of candidates are nominated by their respective fields. The deadline for submission of Graduate School Fellowship applications is January 11, 1993.

Graduate Record Examinations

The graduate fields at Cornell have varying requirements regarding the Graduate Record Examinations (GRE) general test. Clarification of the requirements can be obtained from the appropriate field representative. For applicants to the Field of Veterinary Medicine, the requirement for GRE scores may be waived for students from countries outside the United States if evidence is provided of superior academic performance (e.g., high class rank) as an undergraduate. Combined scores on the general test (verbal and quantitative) are expected to be 1200 or higher. Some fields (e.g., physiology) also require that the advanced subject test be completed.

Applicants for graduate training should arrange for their GRE scores to be sent directly to the Graduate School. This can be done at the time of registration by entering the Cornell Graduate School number, 2098, at the appropriate place in the test form.

Additional Information

Additional information on graduate education and Graduate School applications can be obtained by contacting the graduate education coordinator, Ms. Linda A. Griswold, Graduate Studies Office, C-103 Schurman Hall, College of Veterinary Medicine, Cornell University, Ithaca, New York 14853-6401 (telephone: 607-253-3276; fax: 607-253-3756).

Graduate Faculty Representatives

Field of Veterinary Medicine

Graduate Faculty Representative:
Professor Karel A. Schat
Levine Laboratory
607-253-3364

Field of Physiology

Graduate Faculty Representative:
Professor John F. Wootton
722 Veterinary Research Tower
607-253-3465

Field of Immunology

Graduate Faculty Representative:
Professor Richard H. Jacobson
130 Diagnostic Laboratory
607-253-3677

Field of Microbiology

Graduate Faculty Representative:
Professor Stephen H. Zinder
Wing Hall
607-255-2415

Field of Toxicology

Graduate Faculty Representative:
Professor Ruth Schwartz
N-205A Martha Van Rensselaer Hall
607-255-2054

Field of Biochemistry

Graduate Faculty Representative:
Professor Volker M. Vogt
358 Biotechnology Building
607-255-2443

Field of Zoology

Graduate Faculty Representative:
Professor Drew M. Noden
421 Veterinary Research Tower
607-253-3550

Field of Neurobiology and Behavior

Graduate Faculty Representative:
Professor Ronald M. Harris-Warrick
W159 Seeley Mudd
607-255-8055

Interns and residents perform surgery under the guidance of staff veterinarians.

Internships and Residencies

Internships

The Veterinary Medical Teaching Hospital maintains active internship programs in ambulatory medicine (Ambulatory Clinic), large animal surgery (Large Animal Clinic), and small animal medicine and surgery (Small Animal Clinic).

Objectives

Internships are nondegree programs that provide training for practice, clinical teaching, and specialty board eligibility. Generally a one-year rotating internship in medicine and surgery is a prerequisite for specific residency programs and for

board certification. Internships provide postgraduate education and training leading to a higher level of clinical proficiency.

Programs

Interns in the Small Animal Medicine and Surgery are assigned on a rotating basis to the Internal Medicine Service, the Soft Tissue Surgery Service, the Orthopedic Surgery Service, the Community Practice Service, and the Anesthesiology Service, in the Small Animal Clinic. Each service consists of one faculty member, a resident, an intern, and several fourth-year students.

Interns in Ambulatory Medicine are assigned to one of four geographic services of the Ambulatory Clinic, each of which is the responsibility of an individual faculty member. Schedules are arranged so that the intern has the opportunity to work with most of the faculty.

Interns in Large Animal Surgery spend most of their time assigned to either the Soft Tissue Surgery Service or the Orthopedic Surgery Service of the Large Animal Clinic. Interns do, however, spend approximately one month each year on assignment to the Large Animal Medicine Service.

Interns in all programs share weekend duty and the responsibility for emergency service on a rotating basis, with residents and senior faculty available for consultation. Residents assigned to each service are responsible for the direct supervision of interns and, along with faculty members, evaluate the performance of interns at the end of each rotation.

Interns are expected to attend and participate in hospital rounds and seminars. With permission, interns may attend a limited number of elective courses. Interns are generally required to prepare a clinical paper suitable for publication under the supervision of a faculty member of the intern's choice.

Residencies

The Veterinary Medical Teaching Hospital has clinical residency programs in anesthesiology, dermatology, large animal medicine, large animal surgery, ophthalmology, small animal medicine, small animal surgery, theriogenology, and ambulatory medicine. These training programs are directed toward advanced clinical proficiency and specialty board certification.

Objectives

Residency programs provide the resident with a high level of academic and clinical proficiency in a specific clinical discipline. Each program allows the resident to meet the postgraduate education requirements of the specialty board related to that discipline. Residents gain experience in professional veterinary medical education and in teaching. Residency programs also provide training leading to a high level of specialized veterinary service to the public.

Programs

Residencies are divided between clinical and academic activities. During the course of the program approximately 70 percent of each residents' time is devoted to clinical training and service while approximately 30 percent of time is spent in academic pursuits including didactic teaching, research, and so on. During clinical training periods each resident is supervised by the chief of the service to which the resident is assigned. Academic training is supervised by the section chief and designated faculty of the section representing the academic discipline. Each residency program consists of advanced clinical as well as academic training in a specific discipline. Progression through the program leads to increased responsibility for clinical case management as well as the opportunity to become involved in clinical research. Descriptions of specific residency programs are available from the director of the Veterinary Medical Teaching Hospital.

Each clinical service consists of one faculty member, a resident, an intern, and several fourth-year students. The resident is responsible for the direct supervision of the intern on the service and participates in the clinical teaching of fourth-year students. Residents will have the opportunity to work with all of the faculty involved in the clinical discipline of the residency.

A minimum of two calendar years is required for successful completion of residency programs in anesthesiology, dermatology, large animal medicine, small animal medicine, and ambulatory medicine. Three years of training are required for completion of residency programs in small animal surgery, large animal surgery, ophthalmology, and theriogenology. Opportunities for obtaining an advanced degree (master of science) are available with the residencies in large animal surgery and theriogenology.

Residencies in Veterinary Pathology

The Department of Pathology supports resident programs in anatomic and clinical pathology. These programs are designed to address a national need for veterinary diagnostic pathologists and prepare competitively selected veterinarians for their careers by providing disciplinary skills and efficiency in modern diagnostic/toxicologic pathology. The rigorous training consists of rotating exposure to the extensive case material available through the necropsy, surgical pathology, and clinical pathology laboratories as well as the New York State Diagnostic Laboratory. Learning via responsibility for diagnostic case work is supplemented by slide seminars, lectures, diagnostic journal clubs, tutorials, and rotation through specialty service laboratories in the Department of Pathology and the NYS Diagnostic Laboratory. Summer program courses are conducted in diagnostic electron microscopy, immunohistochemistry, *in*

situ hybridization, laboratory animal pathology, and toxicologic pathology. Special courses include the Olafson Pathology Course and organ system workshops held annually with the faculty and students from the University of Guelph. The time spent in either the anatomical or clinical track of the residency program is determined by the entry-level skill of the resident, but generally lasts two to three years.

Resident Program in Anatomic Pathology

Trainees will acquire considerable skills in the recognition and description of pathologic lesions, the formulation of morphologic diagnosis, the correlation of ante mortem functional changes with post mortem structural alterations, and the conceptual approach to understanding the pathologic expression of a wide variety of disease processes affecting the common animal species. Specialty board certification by the ACVP is a primary goal of the program.

Resident Program in Clinical Pathology

Residents will acquire skills and knowledge in the areas of hematology, clinical biochemistry, clinical immunology, and diagnostic cytology by active participation in these sections of the laboratory under the supervision of the faculty members in clinical pathology. A period of participation in the surgical pathology service, the length of which is determined on an individual basis, is provided for each resident. Residents develop their abilities to interpret laboratory results and morphologic patterns and to relate observations to pathologic and physiologic processes by interaction with members of the faculty and laboratory staff and by directed independent study. Residents also acquire knowledge of laboratory procedures and management through involvement in the laboratory operation.

Third-Year Resident Program in the Diagnostic Laboratory

A third-year resident program is available in conjunction with the Diagnostic Laboratory. Residents who have completed two years in anatomic or clinical pathology have the opportunity to rotate in a third year through the various sections of the New York State Diagnostic Laboratory. These sections include virology, microbiology, parasitology, serology, toxicology, and avian and aquatic medicine. The extent of the involvement of a third-year resident in these specialty areas is dependent upon the rate of progress and the career goals of the trainee. Advanced training in immunohistochemistry and nucleic acid technology are other options for third-year residents.

San Diego Zoo Residency Program

Veterinarians who have completed a minimum of one year of pathology residency at Cornell University are eligible for a special one-year period of residency training in the pathology of exotic animal species. Trainees may return to complete their training at Cornell University following the zoo pathology residency.

Resources and Facilities

Academic Support Services

Roswell P. Flower Veterinary Library

The library was initially endowed by a gift from Roswell P. Flower, governor of the state of New York when the college was founded. The library, located on the second floor of Schurman Hall, has a large reading room, which seats 70; display shelves for current journals; and areas for indexes, abstracts, and other reference books. The three levels of adjoining stacks include journals and monographs and are open for use. Individual study carrels are also available.

The library contains more than 80,000 volumes and regularly receives nearly 1,300 periodicals and series titles. This represents a worldwide selection of veterinary titles plus publications in the biomedical sciences designed to support undergraduate, graduate, clinical, and research programs. Through the various libraries on campus, nearly 5,000,000 volumes and serials are available to students. These collections, interlibrary loans, and photoduplicated materials supplement the research potential of the veterinary library, which is rich in historical and basic research resources as well as recent monographs and selected government publications. A newsletter is issued periodically.

Information on policies and suggestions for the use of the library are provided to students and faculty. A printed guide is also available. Additional instruction in bibliographic research is available for advanced problems.

The wide range of information services offered includes reference assistance, on-line literature searching, interlibrary loan, photoduplication, and current awareness such as our Table-of-Contents. In particular, the computer-assisted literature search service, called COMPASS at Cornell, provides rapid access to numerous bibliographic data bases. MEDLINE, CAB ABSTRACTS, and BIOSIS are also available on CD-ROM for convenient searching of the biomedical literature. Current awareness bibliographies can be generated each month through the on-line systems as well.

The library's audiovisual collection contains more than 1,400 titles in slide, audiotape, and videotape format. These media resources enhance academic programs as well as provide opportunities for self study.

A microcomputer facility was established in the library in 1985 and greatly expanded in 1988 to enhance the college's educational program. The microcomputers are available for use primarily by students and feature a variety of software, including word processing, an electronic spreadsheet, data-base management, and desktop publishing, as well as computer-based tutorials. The classroom area, which features 20 microcomputers, supports course-related and other group-instruction uses.

Office of Educational Development

The faculty of the college are devoted to excellent teaching and care deeply about the quality of students' learning. With the encouragement of the faculty of the college, the Office of Educational Development was established in 1990 under the directorship of Dr. Katherine M. Edmondson. The office provides support for faculty who wish to explore alternatives in teaching styles, improve a particular aspect of a course or method, develop new curricular materials, or incorporate innovative approaches. Its staff includes an education specialist, a computer animator, and a medical illustrator. The office sponsors a series of seminars on teaching and learning, which are scheduled approximately twice a month, and various discussion series for faculty and teaching support specialists on such topics as improving the educational quality of small group learning, assessment, and curriculum design. Research, development, and evaluation of innovations are also conducted by the Office of Educational Development, as are more extensive longitudinal studies relevant to educational research.

Faculty efforts to improve educational offerings have included innovative approaches to cross-sectional anatomy and radiology; case-based computerized testing; case-based approaches to teaching dentistry, epidemiology, physiology, and other disciplines; and a variety of computer programs including animations, simulations, tutorials, and an image data base for pathologic slides, tissue fluids, and photographs. Students have been involved in most of these projects. They are also involved in developing and testing computer courseware, and in developing a variety of curricular materials in several disciplines. These initiatives are the beginning of a concerted effort on the part of the faculty to create an innovative and exciting curriculum.

The Office of Educational Development will play a pivotal role in the design and implementation of the new curricular program, sponsoring numerous workshops for faculty on the tutorial process and seeking student input in the development of new teaching materials. The office also works closely with other components of the college—for example, the library and student services—to ensure coherence and availability of the support structure that faculty, staff, and students need for veterinary education of the highest quality.

Biomedical Communications

The Biomedical Communications Service offers in-house services in photography, video production, and both photomacrography and photomicrography. Film processing, printing, copy photography for teaching slides, slide duplication, and clinical, surgical, and gross specimen photography are some of the services provided. Biomedical Communications is equipped with a Zeiss microscope and macrophotographic unit to photograph small biological specimens and microscope slides. Studio facilities are available for product photography and portraits. Video cameras, the services of an experienced videographer, and both 1/2" VHS and 3/4" video editing systems make possible the production of educational videotapes.

Center for Research Animal Resources

Cornell University established the Center for Research Animal Resources (CRAR) in 1980. The center's director, Dr. Fred W. Quimby, is responsible to the associate vice president for research. The center is charged with the responsibility of implementing animal care programs throughout the university to assure compliance with all state and federal laws regarding the use of animals for teaching, research, and testing. It is also responsible for providing the associate vice president for research and advanced studies, the University Animal Welfare Committee, and the Institutional Animal Care and Use Committee with information on developments in the field of animal welfare legislation and methods of compliance with new regulations.

CRAR offers instructional sessions to faculty, students, research technicians, and animal care technicians, introducing the participants to the ethics of using animals for research, the occupational health program for animal handlers, relevant federal and state regulations, and proper handling and restraint of common laboratory animals, as well as approved methods of euthanasia, available veterinary services, and the proper channels for reporting discrepancies in animal care.

The CRAR staff is also available to counsel and advise investigators, technicians, and others on procedures for proper housing, maintenance, care, sanitation, and disease control of animals and animal facilities. The center maintains information on the suitability of various animal models for research purposes and available alternatives to the use of living animals and regularly updates a listing of sources of disease-free animals.

The center assembles data required by state and federal legislation relative to animal care and use within the university and also maintains files and records all animal protocols for active research, teaching, and extension projects at Cornell.

Biomedical Electronics Service

This service provides on-site repair and maintenance of college equipment as well as design and construction of specialized equipment. The service performs preventive maintenance on a variety of centrifuges, microscopes, computers, and other equipment and offers consultation services on new equipment acquisition and use as well as training in instrumentation concepts and techniques.

Computing Services

The college has developed an integrated hospital computer system designed to meet the operational, administrative, and research needs of the teaching hospital. The interactive on-line system was developed using the MUMPS language and currently supports nearly 400 user terminals throughout the college. In addition, the Diagnostic Laboratory has been automated and a number of their administrative functions are performed on the computer.

Service Programs

Veterinary Medical Teaching Hospital

The Veterinary Medical Teaching Hospital (VMTH) is an essential element of the college and contributes to its three goals of teaching, research, and professional service. The rural setting of Cornell University in a major agricultural area facilitates the availability of a significant large animal caseload; whereas, the city of Ithaca and surrounding urban centers of Syracuse, Rochester, Albany, and Buffalo provides an adequate number of routine and more complex secondary care small animal cases.

With respect to teaching, the VMTH provides hands-on clinical training for professional students in the D.V.M. curriculum, in particular, senior students who spend most of their fourth year engaged in a series of rotations through the various clinical services of the three service units: the Large Animal Clinic, the Small Animal Clinic, and the Ambulatory Clinic. This training is obtained under the close supervision of the faculty, residents, and interns in the hospital. The varied caseload available in the hospital ensures that all students will receive adequate experience with both large and small animal species and in primary care medicine as well as in a variety of clinical specialties. In addition to providing educational opportunities for D.V.M. students, the VMTH provides advanced clinical training to graduate veterinarians who are enrolled in rotating internships or residency programs in a number of specialty areas.

The second vital mission, clinical service, is closely integrated with the teaching mission. Combined caseload in the small and large animal clinics exceeds 15,000 animals per year. The three service units—the Small Animal Clinic, the Large Animal Clinic, and the Ambulatory Clinic—are divided into the principal patient care areas of medicine, surgery, ophthalmology, dermatology, cardiology, neurology, theriogenology, and dentistry. Ancillary specialty service areas include anesthesiology and radiology, the latter providing diagnostic ultrasound and nuclear medicine services. The large and small animal clinics serve as a referral center for

veterinarians practicing within a radius of approximately 150 miles of the college. Thus a significant portion of the caseload consists of complicated medical or surgical problems referred by practicing veterinarians for evaluation by the specialists on the staff or to gain access to the advanced facilities and techniques present in the VMTH. A primary care small animal clinic, called the Community Practice Service, is a recent addition to the hospital. The Ambulatory Clinic provides on-site veterinary service to approximately 400 farms and stables in the upstate New York area. The clinic has seven specially equipped field vehicles. Many of the farms are dairy farms, but a significant number of other operations including horses, sheep, goats, and swine are also served by the practice.

The third mission of the VMTH is clinical research. In addition to being highly qualified teachers and exemplary clinicians, the staff members also are involved in developing new approaches to diagnosis and therapy. The clinical faculty provide the essential blend of medical, surgical, and investigative skills necessary to transfer and apply the discoveries of basic research in the clinical setting.

Diagnostic Laboratory

The Diagnostic Laboratory is a full-service laboratory that offers traditional as well as the newest testing and consultation services through its several divisions: bacteriology, parasitology, virology, automated serology, toxicology, endocrinology, clinical pathology, and field services/extension for testing. Pathology services are offered jointly with the Department of Pathology. The Diagnostic Laboratory serves patients of the Veterinary Medical Teaching Hospital, as well as those of veterinary practitioners in New York State and nationally. Its services are also used by researchers at Cornell as well as other universities and private industry. Research areas include new test development, automated testing, data handling, dissemination of information, pathogenesis, epidemiology, and preventive health programs. Recent research programs have led to the development of DNA probes for classifying enterotoxin and adhesions of pathogenic *E. coli*, a Lyme disease test for dogs and horses, an automated antibody test for infectious bovine rhinotracheitis, monoclonal antibody development for bovine diarrheal virus, improved culture techniques for *Salmonella enteritidis*, and management practices for the eradication of Johne's disease in cattle.

Through a contract with the New York State Department of Agriculture and Markets, the Diagnostic Laboratory is the state laboratory for animal health in New York as well as the accredited federal laboratory for the state. The laboratory provides testing for federal and state disease surveillance and control programs for bovine and porcine brucellosis, equine infectious anemia, and pseudorabies in swine. The laboratory cooperates with various state animal industries and the New York Department of Agriculture and Markets to provide a disease eradication and certified-free herd program for paratuberculosis (Johne's disease), and bluetongue and bovine leukosis disease in cattle, sheep, and goats. There is also an equine viral arteritis control program for the New York State Thoroughbred Breeding industry, a surveillance program for Potomac horse fever, and a surveillance program for *Salmonella enteritidis* in the state's egg-layer poultry industry.

The Diagnostic Laboratory operates a contagious equine metritis (CEM) quarantine station for the state and federal governments which certifies breeding mares and stallions to be free of CEM prior to release into this country. This service provides the primary or corrective clitoral sinusectomy surgery on all foreign mares entering this country via the east coast of the United States.

New York State Quality Milk Promotion Services (QMPS) and Mastitis Control Program

These programs provide services to the New York dairymen and veterinary practitioners for the purpose of enhancing the quality of milk and the prevention of losses because of mastitis. Approximately 2,000 farms are visited annually. Bacteriological cultures from cows and bulk milk tanks are examined for the diagnosis of mastitis and more importantly for herd surveillance in mastitis prevention. The QMPS-Mastitis laboratory and field research are making major contributions in the diagnosis, treatment, control, and prevention of several infectious causes of mastitis including agents such as *Streptococcus agalactiae* and mycoplasma. Research continues on new methods of diagnosis, non-antibiotic therapy, and vaccines.

Reorganization of the program has resulted in four regional laboratories—in Canton, Cobleskill, Geneseo, and Ithaca. With new equipment and trained personnel, the regional laboratories will function as diagnostic satellite laboratories for all species, with expertise in general bacteriology and rapid serologic testing. The need for more sophisticated testing will be met through a courier service to the laboratory in Ithaca. A computer network and a telecommunication-fax system are used to meet rapid communication needs between the laboratories.

Equine Drug Testing and Research Program

The Equine Drug Testing and Research Program operates under a contract from the New York State Racing and Wagering Board. The program provides testing and research to guarantee the integrity of horse racing statewide. Laboratories for testing are located at all New York State pari-mutuel tracks. The central laboratory in Ithaca is recognized nationally and internationally as a reference and research center. Recent research in the laboratory has led to the development of a series of immunoassays for the screening of drugs in horses. The development has provided a more effective, rapid, and less expensive screening technique. Chemical analyses of positive samples are still required for legal confirmation and the study of new drugs. Continued research on the detection and pharmacologic action of new drugs and chemicals is paramount to the integrity of the New York State horse racing industry, a major source of tax revenue for state and local governments.

Species-oriented Programs

James A. Baker Institute for Animal Health

Established in 1950 as the Veterinary Virus Research Institute, the institute changed its name in 1975 to honor the founding director's contributions to veterinary medicine and to reflect the broad scope of the institute's activities.

The institute comprises the Cornell Research Laboratory for Diseases of Dogs and the Cornell Equine Genetics Center. The institute's primary mission has been to prevent loss from infectious diseases in animals. To this end, basic research is conducted on disease-causing organisms to increase knowledge of their nature, means of spread, and methods of controlling their spread. The institute also provides advanced training in immunology, infectious diseases, and arthritis. The institute is currently adding faculty and programs in canine and equine reproduction and genetics and in inherited eye diseases of dogs.

In recent years, facilities have been renovated and expanded to accommodate increased program activity utilizing contemporary methods of molecular and cell biology. Among the added facilities are buildings for the breeding and rearing of specific-pathogen-free dogs and laboratory rodents. A new laboratory complex for the study of inherited canine diseases is currently under construction.

Avian and Aquatic Animal Medicine

A multidisciplinary research program is carried out that encourages collaboration among faculty, staff, and graduate students. Major emphasis has traditionally been on the fields of virology and immunology, but bacteriology and parasitic diseases are also investigated. Laboratory space is located primarily at the P. Philip Levine Laboratory on Snyder Hill. A 41-unit isolation building for studies on infectious diseases is located on campus, and flocks of several genetically defined specific-pathogen-free chickens are maintained in secured buildings near the Levine Laboratory. These flocks provide chick embryos free of all diseases and antibodies for use in experimental studies.

Poultry diagnostic laboratories serving the chicken, duck, and turkey producers of the state are located in Ithaca and Eastport, Long Island. Research on economically important diseases of chickens, turkeys, and ducks and various aquatic species is conducted in Ithaca and Eastport laboratories. Vaccines for the duck industry are produced at Eastport.

At the Levine Laboratory, the Department of Avian and Aquatic Animal Medicine operates the Fish Diagnostic Laboratory, a facility designed to provide assistance to aquaculturalists and others experiencing problems with fish health.

Bovine Research Center

The Bovine Research Center at Cornell University fosters research to improve the productivity, health, and well-being of cattle. It serves scientists with expertise and interest in a broad spectrum of scientific disciplines related to the dairy and beef industries. It encourages cooperative research programs in health, metabolism, reproduction, breeding, and management for improved production.

Equine Research Park

The Equine Research Park, situated on 165 acres of land about one mile from the college, includes stall facilities for 90 horses and ponies and shed facilities for 60 horses. The park contains a half-mile track, a stallion barn, and a separate brood mare barn, where box stalls are provided for foaling mares. A laboratory for reproductive studies and a central breeding facility are located in the brood mare barn. Research at the park covers a variety of equine problems, including reproduction, nutrition, behavior, metabolism, infectious disease, and the special problems of the equine athlete.

The Equine Annex, which includes the Contagious Equine Metritis Quarantine facility, is a separate complex of buildings on Snyder Hill. Adjacent to the annex is a stable and laboratory for the study of equine embryo biology.

Equine Performance Testing Clinic

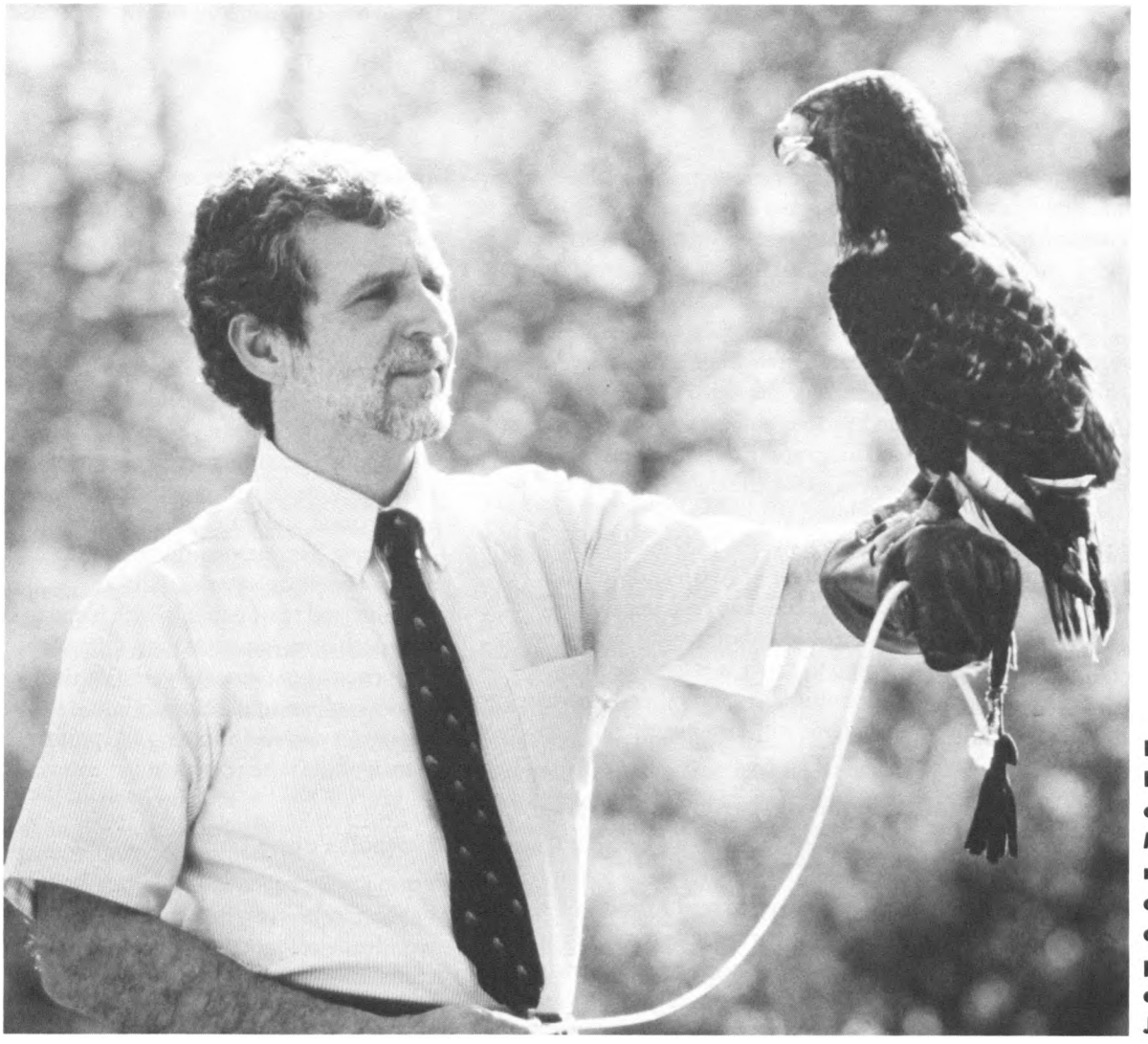
The Equine Performance Testing Clinic is the foundation of the college's developing program in Equine Sports Medicine. The centerpiece of the clinic is the SATO high-speed treadmill capable of speeds of 35 miles per hours and tilting to a 10 per cent slope. This facility also contains examination areas and laboratory space with sophisticated examination and monitoring equipment. The clinic has greatly improved the ability of college veterinarians to examine and treat patients with respiratory problems, lameness, or substandard performance. Additionally, the clinic allows sophisticated research into important diseases affecting the performance of the equine athlete.

Cornell Feline Health Center

Formally approved in 1974, the Cornell Feline Health Center has received worldwide recognition for its work on feline infectious peritonitis, feline lentiviruses (feline immunodeficiency virus), feline leukemia, and respiratory diseases.

Educational outreach is accomplished through continuing education programs and publications. Two newsletters, *Feline Health Topics* (for practitioners) and *Perspectives on Cats* (for cat owners and breeders), are published quarterly and distributed to more than 30,000 people. In addition, the annual *Information Bulletin* provides scientific data on a major feline health concern. Client information brochures are available on a cost basis to practitioners for distribution to their clients.

The Feline Health Center is funded primarily through contributions from cat fanciers and veterinarians, bequests, the memorial program, memberships, and grants from government, industry, and foundations. The Cornell Feline Consultation and Diagnostic Service is available for a fee to veterinarians and cat owners. A consulting veterinarian is on hand to answer health-related questions about cats, along with providing written information.



Dr. George V. Kollias, Professor of Wildlife Medicine, was recruited to the college in 1991 to assume the professorship endowed by Dr. Jay Hyman.

Faculty and Administration

University Administration

Frank H.T. Rhodes, *president*

Malden C. Nesheim, *provost*

James E. Morley, Jr., *senior vice president*

Norman R. Scott, *vice president for research and advanced studies*

Henrik N. Dullea, *vice president for university relations*

M. Stuart Lynn, *vice president for information technologies*

Larry I. Palmer, *vice president for academic programs and campus affairs*

Richard M. Ramin, *vice president for public affairs*

Frederick A. Rogers, *vice president for finance and treasurer*

John R. Wiesenfeld, *vice president for planning*

Walter J. Relihan, Jr., *university counsel and secretary of the corporation*

Joycelyn R. Hart, *associate vice president for human relations*

Walter R. Lynn, *dean of the university faculty*

College Administration

Robert D. Phemister, *dean*

Donald F. Smith, *associate dean for veterinary education*

Douglas D. McGregor, *associate dean for research and graduate education*

Eugenia G. Kelman, *assistant dean for student services*

John A. Lambert, *assistant dean for administration*

Timothy T. Redden, *assistant dean for public affairs*

Roger J. Avery, *chair, Department of Microbiology, Immunology, and Parasitology*

Bruce W. Calnek, *chair, Department of Avian and Aquatic Animal Medicine*

Cornelia E. Farnum, *chair, Department of Anatomy*

Brian R.H. Farrow, *chair, Department of Clinical Sciences*

Bendicht U. Pauli, *chair, Department of Pathology*

David Robertshaw, *chair, Department of Physiology*

Geoffrey W.G. Sharp, *chair, Department of Pharmacology*

Francis A. Kallfelz, *director of the Veterinary Medical Teaching Hospital*

Donald H. Lein, *director of the Diagnostic Laboratory*

Gustavo Aguirre, *director of the James A. Baker Institute for Animal Health*

Neil L. Norcross, *secretary of the college*

Gloria R. Crissey, *director of financial aid; registrar*

Rita W. Harris, *director of personnel*

Katherine M. Edmondson, *director of educational development*

Susanne K. Whitaker, *librarian, Flower Veterinary Library*

Linda F. Emmick, *director of development*

John M. Lewkowicz, *director of computing services*

Fred W. Quimby, *director of the Center for Research Animal Resources*

John E. Saidla, *director of continuing education*

S. Gordon Campbell, *director of international programs*

Fredric W. Scott, *director of the Cornell Feline Health Center*

Maurice E. White, *editor,* ***The Cornell Veterinarian***

Robert O. Gilbert, *director of the Cornell Bovine Research Center*

Larry J. Thompson, *director of biosafety*

George A. Maylin, *director of the Equine Drug Testing Program*

Philip M. Sears, *director of the New York State Mastitis Control Program and Quality Milk Promotion Services*

Faculty

Professors

Aguirre, Gustavo, V.M.D., Ph.D.; ophthalmology

Antczak, Douglas F., V.M.D., Ph.D.; Dorothy Havemeyer McConville Professor of Equine Medicine

Appel, Max J., D.V.M., Ph.D.; virology

Avery, Roger J., Ph.D.; virology, chair of the Department of Microbiology, Immunology, and Parasitology

Bell, Robin G., Ph.D.; immunology

Beyenbach, Klaus W., Ph.D.; physiology; College of Agriculture and Life Sciences

Bloom, Stephen E., Ph.D.; avian medicine

Calnek, Bruce W., D.V.M., M.S.; avian medicine; chair of the Department of Avian and Aquatic Animal Medicine

Campbell, S. Gordon, M.V.Sc., Ph.D.; immunology

Carmichael, Leland E., D.V.M., Ph.D.; John M. Olin Professor of Virology

Cummings, John F., D.V.M., M.S., Ph.D.; anatomy

de Lahunta, Alexander, D.V.M., Ph.D.; James Law Professor of Veterinary Anatomy

Dietert, Rodney R., Ph.D.; immunology and genetics

Dobson, Alan, M.A., Ph.D, Sc.D.; physiology

Farrow, Brian R.H., B.V.Sc., Ph.D; medicine; chair of the Department of Clinical Sciences

Fox, Francis H., D.V.M.; medicine

Hintz, Harold F., Ph.D.; animal nutrition; College of Agriculture and Life Sciences

Houpt, Katherine A., V.M.D., Ph.D.; physiology

Houpt, T. Richard, V.M.D., M.S., Ph.D.; physiology

Kallfelz, Francis A., D.V.M., Ph.D.; medicine; director of the Veterinary Medical Teaching Hospital

King, John M., D.V.M., Ph.D.; pathology

Kollias, George V., D.V.M., Ph.D.; wildlife medicine

Krook, Lennart P., D.V.M., Ph.D.; pathology

Lewis, Robert M., D.V.M.; pathology

Lust, George, Ph.D.; physiological chemistry

McGregor, Douglas D., M.D., D.Phil.; immunology; associate dean for research and graduate education

Minor, Ronald R., V.M.D., Ph.D.; pathology

Naqi, Syed A, B.V.Sc., M.S., Ph.D.; avian medicine

Nathanielsz, Peter W., M.B., Ph.D., M.D.; reproductive biology

Noden, Drew M., M.S., Ph.D.; anatomy

Norcross, Neil L., M.S., Ph.D.; immunology

Noronha, Fernando M., D.V.M.; virology

Pauli, Bendicht U., M.S., D.V.M., Ph.D.; pathology; chair of the Department of Pathology

Phemister, Robert D., D.V.M., Ph.D., pathology, dean of the college

Rebhun, William C., D.V.M.; medicine and ophthalmology

Robertshaw, David, B.V.M.S., Ph.D.; physiology; chair of the Department of Physiology/Section of Physiology

Schat, Karel A., D.V.M., Ph.D.; avian medicine

Schwark, Wayne S., D.V.M., M.Sc., Ph.D.; pharmacology

Scott, Danny W., D.V.M.; dermatology

Scott, Fredric W., D.V.M., Ph.D.; virology

Sharp, Geoffrey W.G., Ph.D., D.Sc.; pharmacology, chair of the Department of Pharmacology

Short, Charles E., D.V.M., M.S.; anesthesiology

Smith, Donald F., D.V.M.; surgery, associate dean for veterinary education

Tapper, Daniel N., V.M.D., Ph.D.; physiology

Tennant, Bud C., D.V.M.; James Law Professor of Comparative Medicine

Wasserman, Robert H., M.S., Ph.D.; James Law Professor of Physiology

White, Maurice E., D.V.M.; medicine

Winter, Alexander J., D.V.M., M.S., Ph.D.; James Law Professor of Veterinary Microbiology

Wootton, John F., M.S., Ph.D.; biochemistry

Associate Professors

Babish, John G., Ph.D.; toxicology

Blue, Julia T., D.V.M., Ph.D.; clinical pathology

Bowser, Paul R., M.S., Ph.D.; aquatic animal medicine

Casey, James W., Ph.D.; virology

Center, Sharon A., D.V.M.; medicine

Cerione, Richard A., Ph.D.; pharmacology

Cooper, Barry J., B.V.Sc., Ph.D.; pathology

Corradino, Robert A., M.S., Ph.D.; physiology

Divers, Thomas J., D.V.M.; medicine

Dubovi, Edward J., M.A., Ph.D.; microbiology

Ducharme, Normand G., D.M.V., M.Sc.; surgery

Erb, Hollis N., D.V.M., M.S., Ph.D.; epidemiology

Farnum, Cornelia E., D.V.M., Ph.D.; anatomy; chair of the Department of Anatomy

Fewtrell, Clare, M.S., D.Phil.; pharmacology

Flanders, James A., D.V.M.; surgery

Fortune, Joanne E., M.S., Ph.D.; physiology

French, Tracy W., D.V.M.; clinical pathology

Fubini, Susan L., D.V.M.; surgery

Gilmour, Robert F., Jr., Ph.D.; physiology

Gleed, Robin D., B.V.Sc.; anesthesiology

Gröhn, Yrjo T., B.V.Sc., D.V.M., M.P.V.M., M.S., Ph.D.; epidemiology

Guard, Charles L., Ph.D., D.V.M.; medicine

Hackett, Richard P., D.V.M., M.S.; surgery

Harvey, H. Jay, D.V.M.; surgery

Henion, John D., M.S., Ph.D.; toxicology

Hornbuckle, William E., D.V.M.; medicine

Jacobson, Richard H., M.S., Ph.D.; immunoparasitology

Kern, Thomas J., D.V.M.; ophthalmology

Lein, Donald H., D.V.M., Ph.D.; theriogenology, director of the Diagnostic Laboratory

Loew, Ellis R., M.S., Ph.D.; physiology; College of Agriculture and Life Sciences

Lucio-Martinez, Benjamin, D.V.M., M.S., Ph.D.; avian medicine

Ludders, John W., D.V.M.; anesthesiology

Marsh, James A., M.S., Ph.D.; animal physiology

Maylin, George A., D.V.M., M.S., Ph.D.; toxicology and environmental health

Miller, William H., Jr., V.M.D.; dermatology

Moise, N. Sydney, D.V.M., M.S.; medicine, cardiology

Nixon, Alan J., B.V.Sc., M.S.; surgery

Nowak, Linda M., Ph.D.; pharmacology

Oswald, Robert E., Ph.D.; pharmacology

Quaroni, Andrea, Ph.D.; physiology; College of Agriculture and Life Sciences

Quimby, Fred W., V.M.D., Ph.D.; pathology

Randolph, John F., D.V.M.; medicine

Reimers, Thomas J., M.S., Ph.D.; endocrinology

Rendano, Victor T., V.M.D., M.S.; radiology

Riis, Ronald C., M.T., A.S.C.P., D.V.M., M.S.; ophthalmology

Scarlett, Janet M., D.V.M., M.P.H., Ph.D.; epidemiology

Schlafer, Donald H., D.V.M., M.S., Ph.D.; pathology

Sears, Philip M., D.V.M., Ph.D.; microbiology

Shin, Sang J., D.V.M.; microbiology

Silver, Robert B., Ph.D.; physiology; College of Arts and Sciences

Smith, Mary C., D.V.M.; medicine

Summers, Brian A., B.V.Sc., M.Sc., Ph.D.; pathology

Trotter, Eric J., D.V.M., M.S.; surgery

Weiland, Gregory A., Ph.D.; pharmacology

Yen, Andrew, M.S., Ph.D.; pathology

Assistant Professors

Ainsworth, Dorothy, M.S., D.V.M., Ph.D.; medicine

Appleton, Judith A., M.S., Ph.D.; immunology

Ball, Barry A., D.V.M., Ph.D.; theriogenology

Barr, Stephen C., B.V.Sc., M.V.S., Ph.D.; medicine

Bertram, John E. A., Ph.D.; anatomy

Bowman, Dwight D., M.S., Ph.D.; parasitology

Chang, Yung Fu, Ph.D.; microbiology

Daels, Peter F., D.V.M., Ph.D.; theriogenology

Dykes, Nathan L., D.V.M.; radiology

Gilbert, Robert O., B.V.Sc., M.Med.Vet.; theriogenology

Gould, Willard J., III, D.V.M.; medicine

Guan, Jun-Lin, Ph.D.; pathology

Hermanson, John W., M.S., Ph.D.; anatomy

Horne, William A., D.V.M., Ph.D.; pharmacology

Levine, Roy A., M.A., Ph.D.; pathology

Lopez, Jorge W., M.S., Ph.D.; virology

MacLeod, James N., Ph.D.; molecular genetics

Mechor, Gerald D., D.V.M., M.V.Sc.; medicine

Meyers-Wallen, Vicki N., V.M.D., Ph.D.; theriogenology

Mohammed, Hussni O., M.V.Sc., D.P.V.M., M.P.V.M., Ph.D.; epidemiology

Moon, Paula F., D.V.M.; anesthesiology

Parrish, Colin R., Ph.D.; virology

Pearce, Edward J., Ph.D.; immunology and parasitology

Ray, Jharna, D.V.M., Ph.D.; molecular biology

Rowland, Peter H ., D.V.M.; pathology

Spitsbergen, Jan M., D.V.M., Ph.D.; aquatic animal medicine

Suter, Maja M., Dipl.Med.Vet., Dr.Med.Vet., Ph.D.; pathology

Senior Clinician

Hillman, Robert B., D.V.M., M.S.; theriogenology

Senior Lecturers

Holmes, Dorothy F., D.V.M., Ph.D.

McFadden, Carol H., M.A.T., Ph.D.; physiology

Winter, Lola E., M.S.; microbiology

Senior Research Associates

Cheng, Chao-Fu, M.S., Ph.D.; pathology

Concannon, Patrick W., M.S., Ph.D.; physiology

Eddlestone, Geoffrey, T., Ph.D.; pharmacology

Fullmer, Curtis S., M.N.S., Ph.D.; physiology

Golemboski, Karen A., Ph.D.

Gonzalez, Ruben N., D.V.M., M.P.V.M., Ph.D.; microbiology

McDonough, Patrick L., M.S., Ph.D.; microbiology

Sandhu, Tirath S., M.S., Ph.D.; avian medicine

Wade, Susan, M.A., Ph.D.; parasitology

Wentworth, Richard A., M.S., Ph.D.; physiology

Wurster, Nancy Burton, M.S., Ph.D.; physiological chemistry

Senior Extension Associates

Bennett, Gary J., D.V.M.; Diagnostic Laboratory

Brunner, Michael A., Ph.D., D.V.M.; Diagnostic Laboratory

Hayes, Gerald L., D.V.M.; Diagnostic Laboratory

Mutalib, Ahmed A.H., B.V.M.S., M.V.Sc., D.V.M.; avian medicine

Richards, James R., D.V.M.

Saidla, John E., D.V.M.; continuing education

Schulte, Hal F., III, M.S., D.V.M.; Diagnostic Laboratory

Thompson, Larry J., D.V.M., Ph.D.; Diagnostic Laboratory

Wilson, David J., D.V.M., M.S.; Diagnostic Laboratory

Lecturers

Gallagher, David P., M.S.; practice management

Hackett, M. Susan, D.V.M.; anatomy

Mizer, Linda A., D.V.M.; anatomy

Paul, Eileen C.A., Ph.D.; physiology

Rawson, Richard E., D.V.M., Ph.D.; physiology

Instructors

Barr, Margaret, D.V.M.; microbiology

Ellington, Joanna, D.V.M., Ph.D.

Irby, Nita, D.V.M.; ophthalmology

Linn, Kathleen A., D.V.M.

Looney, Andrea L., D.V.M.; anesthesiology

Myers, Ron A., Ph.D.

Reynolds, Arleigh, D.V.M.; nutrition, medicine

Yeager, Amy E., D.V.M.; radiology

Field Veterinarian

Julius, Frederic S., D.V.M.; mastitis control (Kingston)

Emeritus Faculty Members

Bentinck-Smith, John, D.V.M.; clinical pathology

Boyer, Clyde I., Jr., V.M.D., M.S.; laboratory animal medicine

Bruner, Dorsey W., Ph.D., D.V.M.; microbiology

Evans, Howard E., Ph.D.; veterinary and comparative anatomy

Fabricant, Julius, V.M.D., M.S., Ph.D.; avian medicine

Gasteiger, Edgar L., Jr., M.S., Ph.D.; physiology

Georgi, Jay R., D.V.M., Ph.D.; parasitology

Gillespie, James H., V.M.D.; microbiology

Habel, Robert E., D.V.M., M.Sc., M.V.D.; anatomy

Hansel, William, M.S., Ph.D.; Liberty Hyde Bailey Professor of Animal Physiology

Hitchner, Stephen B., V.M.D.; avian medicine

Kirk, Robert W., D.V.M.; medicine

Leibovitz, Louis, V.M.D.; aquatic animal medicine

Lengemann, Fred W., M.N.S., Ph.D.; physiology

Lowe, John E., D.V.M., M.S.; surgery

McEntee, Kenneth, D.V.M., Ph.D.(honorary); pathology

Melby, Edward C., Jr., D.V.M.; medicine

Poppensiek, George C., V.M.D., M.S.; James Law Professor of Comparative Medicine

Postle, Donald S., D.V.M., M.S.; veterinary science

Rickard, Charles G., D.V.M., M.S., Ph.D.; pathology

Roberts, Stephen J., D.V.M., M.S.; medicine, theriogenology

Sack, Wolfgang O., D.V.M., Ph.D., Dr.Med.Vet.; anatomy

Schryver, Herbert F., D.V.M., Ph.D.; nutrition

Sellers, Alvin F., V.M.D., M.Sc., Ph.D.; physiology

Sheffy, Ben E., M.S., Ph.D.; nutrition

Whitlock, John H., D.V.M., M.S.; parasitology

Adjunct and Courtesy Faculty Members

Professors

Black, Jonathan, Ph.D. (adjunct); pathology

Burny, Arsene, Ph.D. (adjunct); microbiology

Dodds, W. Jean, D.V.M. (adjunct); pathology

Gallo, Robert C., M.D., D.Sc. (adjunct); microbiology

Mebus, Charles A., D.V.M., M.S., Ph.D., (adjunct); pathology

Nosanchuk, Jerome S., M.D. (adjunct); clinical pathology

Posso, Manuel, M.D. (adjunct); comparative pathology

Rumsey, Gary L., Ph.D. (courtesy)

Schachte, John, Ph.D. (courtesy)

Shalloway, David, M.S., Ph.D. (adjunct); biological sciences

VanPoznak, Alan, M.D. (adjunct); anesthesiology

Associate Professors

Edwards, N. Joel, D.V.M. (adjunct); medicine

Fredrickson, Bruce E., M.D. (adjunct); comparative orthopedics

House, James A., D.V.M., Ph.D. (adjunct)

Kessler, Matt J., D.V.M. (adjunct); medicine

Morris, Mark L., D.V.M., M.S., Ph.D. (adjunct); medicine

Myers, David D., D.V.M., M.S., Ph.D. (courtesy); pathology

Poston, Hugh A., M.S., Ph.D. (courtesy); avian medicine

Torres, Alfonso, D.V.M., Ph.D. (adjunct); pathology

Wood, Philip A., D.V.M., Ph.D. (adjunct); pathology

Assistant Professors

Donnelly, Thomas, B.V.Sc. (adjunct); laboratory animal medicine

Nguyen, Hai T., V.M.D., M.D. (adjunct); pathology

Faculty Committees 1992–1993

General Committee *(Elected by faculty)*

H.N. Erb (1991–94), chairperson

J.F. Cummings (1990–93)

J.F. Randolph (1989–92)

R.D. Gleed (1991–94)

M.E. White (1989–92)

Graduate Field of Veterinary Medicine Executive Committee

(Elected by graduate faculty)

K.A. Schat (1991–94), field representative

P.R. Bowser (1990–93)

Y.T. Gröhn (1992–95)

University Appeals Panel *(Elected by faculty)*

J.T. Blue (1989–94)

L.E. Carmichael (1988–93)

H.J. Harvey (1990–95)

T.J. Reimers (1991–96)

B.A. Summers (1992–97)

Faculty Council of Representatives *(Elected by faculty)*

B.A. Ball (1992–95)

J.W. Casey (1992–95)

E.J. Dubovi (1990–93)

C.E. Farnum (1990–93)

J.W. Hermanson (1992–95)

V.N. Meyers-Wallen (1991–94)

G.A. Weiland (1990–93)

Faculty Curriculum Committee

(Elected by faculty)

J.G. Babish (1/92–12/94)

J.F. Cummings (1/92–12/94)

T.J. Divers (1/92–12/94)

J.A. Flanders (1/90–12/92)

R.F. Gilmour (1/92–12/94)

K.A. Schat (1/90–12/92)

D.W. Scott (1/92–12/94)

M.M. Suter (1/92–12/94)

J.F. Wootton (1/92–12/94)

D.F. Antczak, ex officio

K.M. Edmondson, ex officio

T.J. Reimers, ex officio

D.F. Smith, ex officio

SUNY Senate *(Elected by faculty)*

G. Lust, senator

Admissions Committee

T.J. Kern (1990–93), chairperson

A. de Lahunta (1991–93)

T.W. French (1991–93)

S.L. Fubini (1991–93)

R.O. Gilbert (1992–94)

C.L. Guard (1992–94)

K.A. Houpt (1991–93)

W.S. Schwark (1991–93)

M.C. Smith (1992–94)

E.G. Kelman, ex officio

Committee on Scholarships

H.J. Harvey, chairperson

S.A. Center

W.A. Horne

R.M. Lewis

E. Loew

L.A. Mizer

A.J. Nixon

G.R. Crissey, ex officio

T.T. Redden, ex officio

Committee on Deficient Students

R.C. Riis, chairperson

A. Dobson

C.M. Fewtrell

S.L. Fubini

Committee on Student Conduct

J.W. Casey

F.H. Fox

J.F. Randolph

M.C. Smith

International Advisory Committee

S.G. Campbell, chairperson

R.N. Gonzalez (1993)

R.H. Jacobson (1992)

F.A. Kallfelz (1993)

S.A. Naqi (1994)

D. Robertshaw (1992)

S.J. Shin (1994)

Veterinary Animal Use and Care Committee

J.G. Babish
D.D. Bowman
P.R. Bowser
B.J. Cooper
J.W. Hermanson
V.N. Meyers-Wallen
P.W. Nathanielsz
D.D. McGregor, ex officio
F.W. Quimby, ex officio

Committee on the Use of Live Animals in Teaching

P.W. Concannon, chairperson
L.A. Dillingham
J.E. Fortune
M.S. Hackett
J.W. Ludders
B.A. Summers

Committee on the College Library

B.R.H. Farrow, chairperson (1993)
D.M. Ainsworth (1994)
J.A. Appleton (1995)
Y.F. Chang (1994)
R.A. Corradino (1995)
A. Dobson (1993)
H.E. Evans (1995)
R.E. Oswald (1993)
J.M. Spitsbergen (1994)
S.K. Whitaker, ex officio
D.D. McGregor, ex officio
D.F. Smith, ex officio

Pharmacy and Therapeutics Committee

S.C. Barr
T.J. Divers
N.G. Ducharme
J.W. Ludders
W.H. Miller
W.S. Schwark
S.J. Shin
G.A. Decker, ex officio
F.A. Kallfelz, ex officio

Special Committees 1992–93

Curriculum Design Group Coordinators

D.F. Smith, chairperson
B.J. Cooper
K.M. Edmondson
C.E. Farnum
B.R.H. Farrow
D.M. Noden
J.E. Saidla
K.A. Schat
F.W. Scott
M.M. Suter
D.N. Tapper

Continuing Education Committee

J.E. Saidla, chairperson
L.A. Ritzler, program coordinator
M.A. Brunner
T.J. Divers
F.H. Fox
W.J. Gould
H.J. Harvey
W.H. Miller
A.A.H. Mutalib
W.S. Schwark

Senior Seminar Committee

F.H. Fox, chairperson
J.A. Flanders
R.O. Gilbert
T.R. Houpt
J.M. King
G. Lust
M.C. Smith

Biohazard Safety Committee

E.J. Dubovi, chairperson
J.G. Babish
L.E. Carmichael
P.L. McDonough
T.J. Reimers
F.W. Quimby, ex officio
L.J. Thompson, ex officio

Computer Advisory Committee

R.E. Oswald, chairperson
J.E.A. Bertram
B.J. Cooper
N.L. Dykes
Y.T. Gröhn
R.H. Jacobson
J.W. Ludders
R.R. Minor
H.O. Mohammed
J.M. Lewkowicz, ex officio
S.D. Rutherford, ex officio
D.F. Smith, ex officio

College Research Council

R.E. Oswald (1990–93), chairperson
S.E. Bloom (1992–95)
L.E. Carmichael (1992–95)
R.R. Minor (1991–94)
D.M. Noden (1992-95)
J.M. Scarlett (1990–93)
B.C. Tennant (1990–93)
D.D. McGregor, ex officio
G.A. Maylin, reviewer
A. vanTienhoven, reviewer
A.J. Winter, reviewer

Graduate Education Advisory Committee

D.D. McGregor, chairperson
R.A. Cerione
B.U. Pauli
J.M. Scarlett
G.W.G. Sharp
B.C. Tennant
R.H. Wasserman

James Law Lecturer Series Committee

P.W. Nathanielsz, chairperson
R.G. Bell
H.E. Evans
B.R.H. Farrow
G.W.G. Sharp
R.H. Wasserman

Affirmative Action Committee

S.A. Naqi, chairperson
R.G. Bell
C.E. Farnum
C.M.S. Fewtrell
J.L. Guan
M.C. Smith
D.N. Tapper
R.W. Harris, ex officio
S.J. Selden, ex officio

Common Environment Committee

J.W. Ludders, chairperson
J.T. Blue
P.R. Bowser
C.M.S. Fewtrell
J.W. Hermanson
E.G. Kelman
T.T. Redden
T.J. Reimers
J.M. Scarlett
D.N. Tapper

Centennial Committee

B.C. Tennant, chairperson
B.W. Calnek
S.G. Campbell
L.E. Carmichael
C.E. Farnum
G.W.G. Sharp
R.C. Grambow
F.A. Kallfelz
R.M. Lewis
D.H. Lein
R.H. Wasserman
S.K. Whitaker
E.A. Fontana, staff support

Faculty Committee on Statutory Compensation

Faculty representative to be appointed

Students/Faculty Liaison Committee

Student and faculty representatives are elected by the student body.

Honor Code Committee

Students and faculty representatives are elected by the student body.

Graduate/Faculty Liaison Committee

Graduate students select the committee.

Environmental Health Committee (Faculty-Staff)

Rita W. Harris, chairwoman

Snyder Hill Advisory Committee

D.D. McGregor, chairperson
B.W. Calnek
B.R.H. Farrow
F.W. Quimby
J.F. Timoney

Biotechnology Scientific Advisory Board

D.F. Antczak

College Advisory Council

Richard C. Grambow, D.V.M., chair
Fairmount Animal Hospital

Donald P. Berens, Trustee Emeritus
President, D.P. Berens, Inc.

Mr. Robert W. Bitz (Trustee)
President, Plainville Turkey Farm, Inc.

Stephen J. Ettinger, D.V.M.
California Animal Hospital, Inc.

Albert Fried, Jr.
Albert Fried Company

Ralph W. F. Hardy, Ph.D.
President, Boyce Thompson Institute for Plant Research
Cornell University

John Patrick Jordan, Ph.D.
Administrator, Cooperative State Research Service
United States Department of Agriculture

John L. Mara, D.V.M.
Director of Professional Affairs
Hill's Pet Products

Anna E. McElroy, Ph.D.
Director, New York Sea Grant

Mark L. Morris, Jr., D.V.M., Ph.D.
Mark Morris Associates

Bernard W. Potter (Trustee Emeritus)
B. W. Potter Holstein Dairy Farm

Kenneth J. Rotondo, D.V.M.
Rotterdam Veterinary Hospital

James L. Seward
New York State Senate

Richard J. Sheehan, D.V.M.
Meadowbrook Farm

David Shepherd (Observer)

Patricia L. Thomson, D.V.M.
Manheim Pike Veterinary Hospital, Inc.

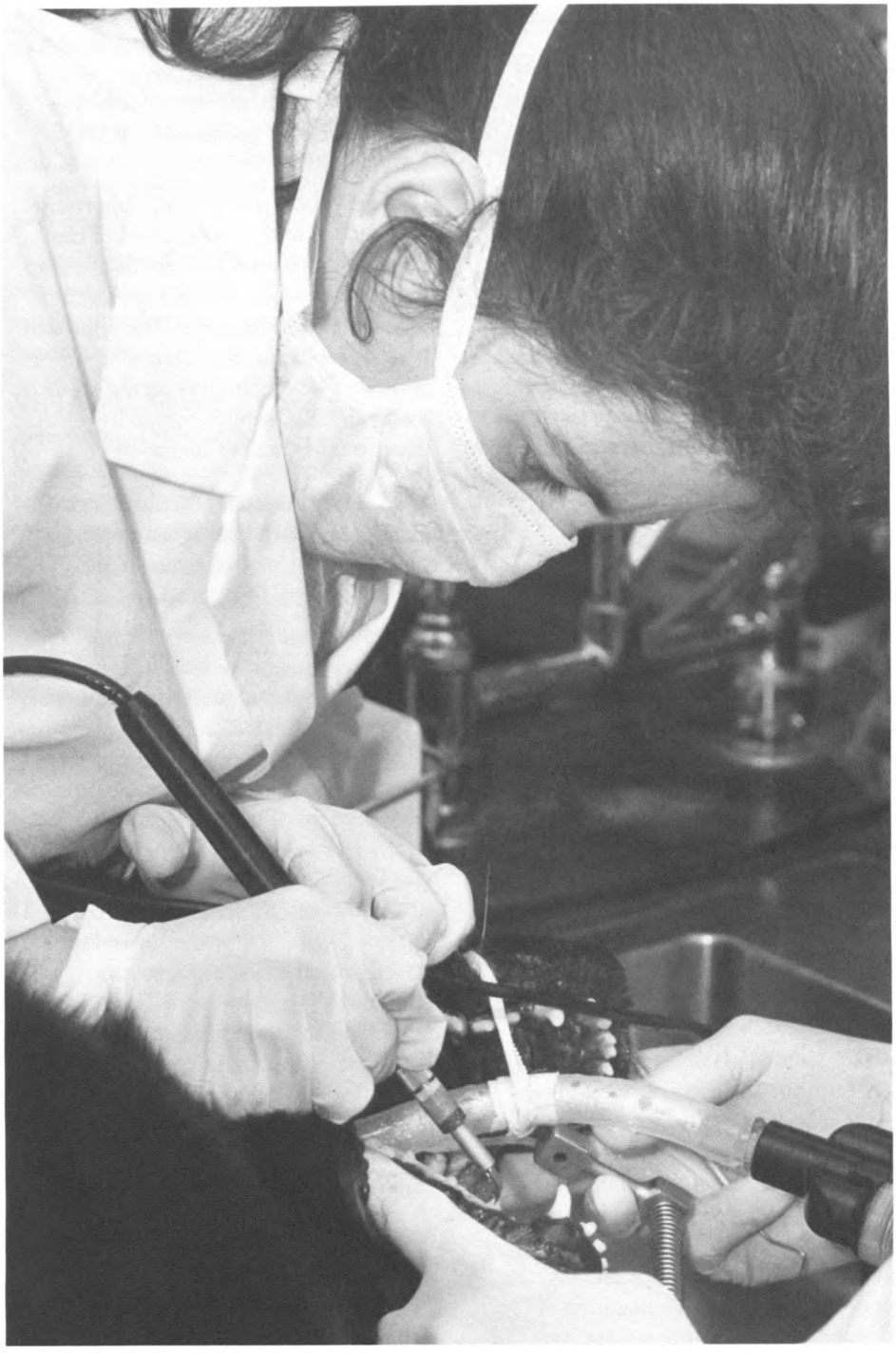
Kent R. Van Kampen, D.V.M., Ph.D.
Chief Executive Officer
Virogenetics Corporation

Stephen H. Weiss (Emeritus)
Managing Partner, Weiss, Peck & Greer

Bruce Widger, D.V.M. (Trustee Emeritus)

Harold M. Zweighaft, D.V.M.
West Parc Veterinary Clinic

Description of Courses



Hands-on experience begins early in a D.V.M. student's education. Students learn how to prevent and treat dental problems in companion animals.

Under each department heading there are brief descriptions of the courses offered. Most of the courses are part of the veterinary core curriculum; some are elective to veterinary students or are given primarily for graduate students or students of other colleges of the university. Courses enclosed in brackets are not offered in the fall of 1992 or the spring of 1993.

Courses in other colleges available to all Cornell students are listed in *Courses of Study*.

Listed with each department are current faculty and teaching support staff. For a more complete listing of personnel, please see the faculty section.

Anatomy

Cornelia E. Farnum, chair
D-206 Schurman Hall
607-253-3545

Professors: J.F. Cummings, A. de Lahunta, H.E. Evans, D.M. Noden; associate professor: C.E. Farnum; assistant professors: J.E.A. Bertram, J.W. Hermanson; lecturers: L.A. Mizer, M.S. Hackett; instructor: R. A. Meyers.

The major objectives of the Department of Anatomy are the education of veterinary students and the performance of investigations that contribute new information to the scientific literature. Graduate education is a component of this research activity. Textbook preparation is a major activity that supports the teaching program and contributes to the professional literature.

The educational program in the anatomical sciences provides a solid foundation for other basic sciences and for courses in the clinical sciences. Significant efforts are made to integrate teaching of anatomy with those courses and to relate anatomical studies to clinical, medical, and surgical situations.

First-year students are introduced to the professional vocabulary in the anatomical sciences that will serve them throughout their professional career.

Research activities span a large range of basic and applied subjects in the fields of developmental biology including postnatal development, cellular biology, biomechanics, neuromuscular development, neuroanatomy, neuropathology, and clinical neurology. Faculty are frequently consulted in their various areas of expertise.

VETA 500 Gross Anatomy: Small Animal
Fall. 4 credits. Limited to first-year veterinary students. Letter grades only. L.A. Mizer (coordinator); A. de Lahunta; M.S. Hackett; R.A. Meyers.

Students study the comparative and regional aspects of the gross anatomy of organ systems as well as radiographic anatomy. The lectures (2 hours a week) are supplemented by demonstrations, films and clinical cases. In laboratories (7.5–10 hours per week), mammalian structure is studied by detailed systematic and regional dissection of the dog. This is augmented by the use of pre-dissected specimens, postmortem specimens, and skeletal materials. The importance of a good knowledge of anatomy in completing an accurate physical examination is emphasized by live animal palpation.

VETA 501 Gross Anatomy: Large Animal
Spring. 5 credits. Limited to first-year veterinary students. Letter grades only. Prerequisite VETA 500. J.E.A. Bertram; J.W. Hermanson (coordinator); M.S. Hackett; L.A. Mizer.

Students study regional anatomy of the common large domestic species. Features and topics that have a direct relevance to function and clinical practice are emphasized. In lectures (1 hour a week), specific features unique to large animals and basic structural and functional concepts more easily understood in large animals are addressed. In laboratories (7 hours a week), complete dissection of a horse, cow, goat, and pig is undertaken to study the normal anatomical structure, to familiarize students with normal radiographic anatomy, and to prepare students for transrectal examination and surgical exploration by deep palpation of superficial structures. Group oral presentations are required to provide students with experience in making informal presentations about relevant subject material.

VETA 502 Microscopic Anatomy
Fall and spring. 3.5 credits. Primarily for first-year veterinary students. Others by permission of the instructor. Prerequisites: completion of, or concurrent registration in, VETA 500 or 700. Letter grades only. J.F. Cummings (coordinator); M.S. Hackett; L.A. Mizer.

The microscopic structure of the cell, tissue, and organs of domestic animals is studied. Illustrated lectures (3 hours a week) are presented to relate structure to function, correlate microscopic and gross anatomy, and establish a foundation for subsequent studies in physiology and pathology. The laboratories (3 hours a week) begin with the entire class being introduced to histologic sections to be studied on an overhead monitor attached to the instructor's microscope. During the remaining laboratory period, routine histologic slides, electron photomicrographs, and immunocytochemical and histochemical preparations are studied by students in pairs with assistance from instructors.

VETA 504 Neuroanatomy and Clinical Neurology
Fall and spring. 2.5 credits. Limited to first-year veterinary students. Letter grades only. A. de Lahunta.

Fundamentals of functional neuroanatomy and diseases of the nervous system are taught so that each student is competent in the diagnosis of clinical neurologic disorders of domestic animals. This is a vertically integrated course that includes dissection of the central nervous system of the dog, the anatomic basis for the diagnosis of diseases of the nervous system, and the differential diagnosis of those diseases. Clinical cases with pertinent lesions are demonstrated with each system. Films of clinical patients are used to demonstrate the clinical signs produced by the various diseases. Slides of gross and microscopic lesions are used to emphasize the clinical and neuroanatomic relationships and to stress characteristic features of representative conditions.

VETA 505 and 506 Applied Anatomy
Fall (505), spring (506). 1 credit each term. Limited to third-year veterinary students. Letter grades only. A. de Lahunta.

This course provides an opportunity for practice in the recognition of the anatomical features that are essential to diagnostic, surgical, obstetrical, and postmortem procedures. The approach is topographical, comparative, and clinical. The emphasis is on the study of living animals, supplemented by dissections, models, and radiographs.

VETA 507 Animal Development
Fall. 3 credits. Primarily for first-year veterinary students. Letter grades only. A. de Lahunta; D.N. Noden.

This course focuses on the preimplantation, embryonic, and fetal stages of development in amniotic vertebrates, particularly domesticated animal species. While primary emphasis in lecture (3 hours a week) is on the morphologic development of the young embryo, of fetal organ systems, and of placentae, considerable attention is given to understanding the mechanisms controlling developmental processes and the genetic or environmental factors responsible for congenital defects. Preserved specimens illustrating the development and common malformations of specific organ systems are available for study in the laboratory. Oral group presentations allow students to explore specified areas in depth.

VETA 508 Anatomy of the Fish and Bird
Spring. 0.5 credit. Limited to first-year veterinary students. Letter grades only. H. Evans (coordinator); J.W. Hermanson.

An introduction to the structure and function of fishes and birds. Illustrated lectures, literature display, and demonstration specimens precede students' dissection of fresh local fishes and chickens.

VETA 600 Special Projects in Anatomy (Selective)
Fall and spring. 1 credit per 2.5 hour period. By permission of the instructor.

VETA 601 Research Opportunities in Veterinary Medicine (Selective)
Fall, spring, summer, and January. 1–4 credits. By permission of the instructor. S-U grades only.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

VETA 602 Advanced Clinical Neurology (Selective)
Spring. 1 credit. Prerequisite: first two semesters of veterinary curriculum. S-U grades only. A. de Lahunta.

Correlation of anatomy, physiology, and pathology in the diagnosis and treatment of diseases of the nervous system and an understanding of their pathogenesis. Case demonstrations are emphasized.

VETA 603 Gross Anatomy of the Cat (Selective)
2 credits. Limited to second- and third-year veterinary students. Maximum enrollment, 8 students. Letter grades only. C.E. Farnum.

The purpose of this selective course is to study the gross anatomy of the domestic cat, by building upon previous knowledge of carnivore gross anatomy gained from Anatomy 500, Gross Anatomy: Small Animals. The course will be taught in a small-group, tutorial format, with eight students and a tutor. During the course of the semester, there will be two cases, and each will be developed over a four-week period. In addition to the tutorials, pairs of students will dissect a perfused cadaver. A variety of teaching specimens from the anatomy collection also will be available for small-group and independent study.

VETA 604 Biomechanics: Concepts and Techniques (Selective)
Spring. 2 credits. J.E.A. Bertram.

This selective is an introduction to biomechanics theory and analysis strategy for various aspects of animal tissues, structures, and functions. General concepts of biomechanics are complemented by the demonstration of mechanical analysis techniques (data collection, analysis, and interpretation). Fluid, soft tissue, hard tissue, and whole animal mechanics will be considered, with emphasis determined by class interest. The object of this class is to give students an understanding of the mechanics affecting morphology and performance, and to provide practical experience that will allow informed evaluation of research based on mechanical considerations.

Avian and Aquatic Animal Medicine

Bruce W. Calnek, chair
P. Philip Levine Laboratory
607-253-3365

Professors: S.E. Bloom, B.W. Calnek, S.A. Naqi, K.A. Schat; associate professors: P.R. Bowser, B. Lucio-Martinez; assistant professor: J.M. Spitsbergen.

The department is strongly research oriented, with emphasis on disease pathogenesis at molecular, cellular, and organismal levels. Diagnostic laboratories for domestic poultry and both freshwater and marine aquatic animals are located at the college and at one regional laboratory in New York State. These laboratories provide fresh material for teaching and research purposes. Research facilities are found at the Duck Research Laboratory at Eastport, L.I., and at the P. Philip Levine Laboratory near the campus. Departmental laboratories are equipped for studies in the disciplines of pathology, microbiology, immunology, and molecular biology. Special emphasis has been placed on studies of infectious diseases. Well-defined genetic strains of specific-pathogen-free chickens are maintained as a source of experimental animals. Isolation units are available for studies of infectious diseases of domestic poultry, pet and wild birds, and aquatic animals.

[VETAV 255 Poultry Hygiene and Disease (also Animal Science 332)
Fall, odd-numbered years; 2 credits. Minimum enrollment, 6 students. Maximum enrollment, 16 students. Prerequisites: MICRO 290 and permission of the instructor; letter grades only. B. Lucio-Martinez.

A combination of lecture, discussion, laboratory and literature search exercises. Focuses include poultry industry structure and management practices and their effect on poultry health. Selected diseases are used to discuss control through eradication and immunization. Includes laboratory demonstration/exercises on anatomy and on bleeding, euthanasia, and necropsy techniques.]

VETAV 555 Avian Diseases
Fall. 2 credits. Limited to third-year veterinary students. Letter grades only. S.A. Naqi; W.J. Gould.

Avicultural Medicine Section (1 credit. W.J. Gould). A clinically oriented course that starts with restraint and dietary requirements of pet birds and then focuses primarily on presentation, diagnosis, and treatment of common pet bird diseases. A laboratory session uses budgerigars to illustrate the fundamentals of restraint and physical examination of pet birds.

Poultry Disease Section (1 credit. S.A. Naqi). Presentations focus on the etiology, pathogenesis, diagnosis, and control of some of the common diseases of domestic and commercial poultry. Consequences of stress and immunologic impairment for the disease process are discussed. Basic concepts of epidemiology and preventive medicine in relation to the current disease control practices in the poultry industry are emphasized. Laboratory sessions address handling and restraint of birds, bleeding techniques, euthanasia, and necropsy procedures.

VETAV 614 Research Opportunities in Veterinary Medicine (Selective)
By arrangement with instructor. 1–4 credits. Primarily for veterinary students. Others by permission of the instructor. S-U grades. K.A. Schat.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

[VETAV 630 Diseases of Aquarium Fishes (Selective)
Spring, even-numbered years. 2 credits. Minimum enrollment, 8 students. Maximum enrollment, 16 students. Primarily for veterinary students; others by permission of the instructor. S-U grades. P.R. Bowser.

A lecture and laboratory course dealing with health management of aquarium fishes including aquarium system design, water quality, and pathogenesis, diagnosis, and management of commonly encountered diseases of aquarium fishes.]

VETAV 631 Fish Health Management (Selective)
Spring, odd-numbered years. 2 credits. Minimum enrollment, 8 students. Maximum enrollment, 16 students. Primarily for veterinary students. Others by permission of the instructor. S-U grades. P.R. Bowser.

A lecture and laboratory course dealing with principles and practices designed to minimize diseases in fishes maintained in aquaria, aquaculture facilities, and research laboratories. The course emphasizes interactions among the fish, the environment, and pathogenic organisms that are found in the fish culture environment.

[VETAV 663 Veterinary Medicine in Developing Nations (Selective)
Spring, even-numbered years. 2 credits. Maximum enrollment, 20 students. Primarily for veterinary students. Others by permission of the instructor. S-U grades. K.A. Schat.

This lecture and discussion course gives students a broader insight into the many problems important for lesser-developed nations. Special emphasis is placed on nonveterinary aspects related to the development of those countries, such as sociological and economic interactions, the transfer of technology, and the role of women. Final selection of the topics depends on the availability and expertise of participating faculty. Active participation of students is encouraged.]

VETAV 672 Aquavet I: Introduction to Aquatic Veterinary Medicine (Selective)
Four weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. 4 credits. Maximum enrollment 24 students from Cornell University, the University of Pennsylvania, and other U.S. colleges of veterinary medicine. By permission of the instructor. S-U grades. P.R. Bowser.

The course is sponsored by Cornell University, the University of Pennsylvania, and three marine science institutions at Woods Hole: the Marine Biological Laboratory, the Woods Hole Oceanographic Institution, and the Northeast Center of the National Marine Fisheries Service. It is designed to introduce veterinary students to aquatic animal medicine. The marine environment is described and visited on field trips in the Woods Hole area. Specific aspects of the comparative anatomy, physiology, nutrition, microbiology, pathology, and medicine of a variety of marine and freshwater species are discussed. Some emphasis is placed on systems of aquaculture. The specific diseases of a few selected species are presented as examples, including the diseases of crustaceans, shellfish, finfish, and marine mammals. The course is taught by an invited faculty of 33 individuals who are leaders in their respective fields of aquatic animal medicine. Students present seminars on appropriate topics.

VETAV 673 Aquavet II: Comparative Pathology of Aquatic Animals (Selective)
Two weeks of full-time instruction at Woods Hole, Massachusetts, immediately after the spring term. 2 credits. Maximum enrollment, 18 students. Prerequisites: formal course work in diseases of aquatic animals or appropriate experience and permission of the instructor. S-U grades. P.R. Bowser.

This course is sponsored by Cornell University, the University of Pennsylvania, and three marine science institutes at Woods Hole: the Marine Biological Laboratory, the Woods Hole Oceanographic Institution, and the Northeast Center of the National Marine Fisheries Service. It is an advanced course in the comparative pathology of aquatic invertebrates and vertebrates commonly used as laboratory animals. The material presented will consist of discussions of the diseases of aquatic animals as well as extensive use of the microscope to examine the histopathology associated with these diseases. The course is taught by an invited faculty of 12 individuals who are leaders in their respective fields of aquatic animal medicine.

VETAV 770 Advanced Work in Avian Diseases (Graduate)
Fall and spring. Credit to be arranged. By special arrangement with the instructor. Letter grades only. S.A. Naqi.

VETAV 772 Advanced Work in Aquatic Animal Diseases (Graduate)
Fall and spring. Credit to be arranged. By special arrangement with the instructor. S-U grades only. P.R. Bowser.

VETAV 773 Advanced Work in Avian Immunology (Graduate)
Fall and spring. Credit to be arranged. By special arrangement with the instructor. Letter grades only. K.A. Schat.

Clinical Sciences

Brian R.H. Farrow, chair
427 Veterinary Research Tower
607-253-3570

Section of Medicine. Professors: G. Aguirre, L.E. Carmichael, A. de Lahunta, B.R.H. Farrow, F.H. Fox, G.V. Kollias, W.C. Rebhun, D.W. Scott, B.C. Tennant; M.E. White; associate professors: S.A. Center, T.J. Divers (chief), C.L. Guard, W.E. Hornbuckle, T.J. Kern, W.H. Miller, N.S. Moise, J.F. Randolph, R.C. Riis, M.C. Smith; assistant professors: D.M. Ainsworth, S.C. Barr, W.J. Gould, G.D. Mechor; instructor: A.J. Reynolds

Section of Surgery. Professor: D.F. Smith; associate professors: N.G. Ducharme, J.A. Flanders, S.L. Fubini, R.P. Hackett (chief), H.J. Harvey, A.J. Nixon, E.J. Trotter; instructor: K.A. Linn

Section of Theriogenology. Assistant professors: B.A. Ball, P.F. Daels, R.O. Gilbert (chief), V.N. Meyers-Wallen; senior clinician: R.B. Hillman

Section of Anesthesiology. Professor: C.E. Short; associate professors: R.D. Gleed (chief), J.W. Ludders; assistant professor: P.F. Moon; instructor: A.L. Looney

Section of Epidemiology. Associate professors: H.N. Erb, Y.T. Gröhn, J.M. Scarlett (chief); assistant professor: H.O. Mohammed

Radiological and Physical Diagnostics. Professor: F.A. Kallfelz; associate professor: V.T. Rendano, Jr.; assistant professor: N.L. Dykes (chief)

Mastitis Research. Professor: N.L. Norcross

Other Faculty. Professor: H.F. Hintz (joint appointment); Lecturer: D.P. Gallagher

The majority of the lectures and laboratory courses provided by the Department of Clinical Sciences are taught during the third year of the veterinary curriculum. The practical application of the students' basic knowledge in veterinary medicine to clinical diagnosis and therapy of diseases is emphasized at this time.

The fourth year is devoted to intensive training in clinical medicine, surgery, and the specialty disciplines. Students are assigned responsibility for patient care under close faculty supervision. The curriculum consists mostly of an assignment to clinical services throughout the teaching hospital and ambulatory clinic.

During the senior year, the students participate for 32 weeks on assigned clinical services and for four weeks on Selective rotations or Opportunity Blocks.

VETCS 520 Preventive Medicine in Animal Health Management

Spring. 1 credit. Required of all third-year veterinary students. Graduate and animal science students by permission of the instructor. Letter grades only. H.N. Erb (coordinator); Y.T. Gröhn; and guest lecturers.

Topics include introductory lectures on cost-benefit analysis, ventilation and other aspects of safe animal housing, and genetics. A few lectures deal with species-specific herd health programs (e.g., setting up a dairy herd health program, working with dog or cat breeders or humane shelters). The emphasis in these lectures is on methods and problems in setting up programs, record keeping, decisions on what to include, and the difference between preventive programs and sporadic diagnostic and therapeutic practice.

VETCS 545 Clinical Epidemiology

Fall. 2 credits. Required of all second-year veterinary students. Others by permission of the instructor. Letter grades only. H.N. Erb; H.O. Mohammed; J.M. Scarlett (coordinator).

This course reviews the basic concepts of infectious and chronic disease epidemiology. Descriptive, analytic, and experimental study designs are covered, as well as evaluation of diagnostic and screening tests, data quality, and ethical considerations in biomedical research. In addition, the application of epidemiologic methods to the investigation of disease outbreaks is discussed.

VETCS 547 Practice Management (Selective)

Fall and spring. 2 credits. Intended for fourth-year veterinary students. Open to spouses of currently matriculated veterinary students, graduates of the College and students of other schools of veterinary medicine by permission of the instructor. S-U grades only. D.P. Gallagher.

Designed for the individual who anticipates a career in private practice, this course bridges the gap between the traditional scientific and clinical training that a student receives and the nonclinical aspects of the setting in which he or she will ultimately work. The subject matter focuses on the tasks and techniques of fiscal, administrative, and marketing management in the context of a veterinary practice. Employing a combination of readings, lecture, training videos, simulations, case studies and discussion, the topics covered include bookkeeping, accounting, financial and economic analysis, pricing, credit and collection techniques, inventory maintenance and control, marketing and public relations, organizational structure, communication, staff development and personnel management, and the use of computers. Also included are a review of issues related to the job search process, an introduction to basic concepts of personal financial planning, and factors relevant to evaluating opportunities for practice ownership.

VETCS 548 Anesthesiology

Fall. 1 credit. Required of all third-year veterinary students. Not open to students of other colleges. Letter grades only. J.W. Ludders; R.D. Gleed (coordinator) and C.E. Short.

The basic principles of anesthesiology are discussed, including premedication, injectable anesthesia, inhalant anesthesia, and control of pain. Special emphasis on the information necessary to choose a rational anesthetic technique for patients with common problems. Specific areas covered include fluid administration in the peri-anesthetic period, postoperative care, patient-monitoring techniques, and cardiopulmonary resuscitation. Students are assumed to understand the basics of pharmacokinetics, pharmacodynamics, cardiovascular function, and respiratory gas exchange.

VETCS 561 Theriogenology I

Spring. 3 credits. Required of all second-year veterinary students. Not open to others. Letter grades only. Fee, $15. B.A. Ball; P.F. Daels; R.O. Gilbert (coordinator); R.B. Hillman; V.N. Meyers-Wallen.

A presentation of applied physiology and endocrinology of the male and female reproductive tract using the bovine model. Management practices utilized to ensure maximum reproductive efficiency are discussed. Diagnosis, treatment, and prevention of congenital, infectious, and endocrine diseases affecting the genital organs are covered. The technique, advantages, and risks involved in artificial insemination are detailed. Hands-on laboratory experience is provided for learning rectal

examination of the genital organs in cattle and horses. Reproductive tracts recovered from the slaughterhouse are used to illustrate and correlate the stage of the estrus cycle with ovarian and uterine changes as well as to provide demonstrations of many of the pathologic conditions of the genital organs. Laboratory sessions also provide experience in breeding soundness evaluation in bulls and stallions.

VETCS 562 Theriogenology II
Fall. 3 credits. Required of all third-year veterinary students. Not open to others. Letter grades only. Fee, $15. B.A. Ball (coordinator); P.F. Daels; R.O. Gilbert; R.B. Hillman; V.N. Meyers-Wallen.

Applied physiology and endocrinology in the canine, feline, equine, and porcine species are covered. Management practices to ensure maximum reproductive efficiency are discussed for each species. Laboratory exercises include continuation of training in rectal examinations as well as hands-on experience in obstetrical manipulation and fetotomy techniques, practice in determination of the stage of the estrus cycle in bitches by vaginal cytology, and breeding soundness evaluation of mares.

VETCS 563 Large Animal Medicine and Surgery
Fall. 5 credits. Limited to third-year veterinary students. Letter grades only. Faculty of medicine and surgery sections; W.C. Rebhun (coordinator).

This is a team-taught lecture course that is designed to impart a general knowledge of the principles of diagnosis and treatment of medical and surgical diseases of large domestic animals. Major emphasis is on cattle and horses, but some lectures are devoted to swine and small ruminants. Important medical and surgical diseases of all major body systems are discussed as well as metabolic disorders and those associated with various toxicities and poisonous plants. Several lectures address the diagnosis and treatment of various lamenesses in large animals.

VETCS 564 Large Animal Medicine and Surgery
Spring. 6 credits. Limited to third-year veterinary students. Letter grades only. Faculty of medicine and surgery sections; W.C. Rebhun (coordinator).

A continuation of lectures designed to impart a general knowledge of the principles of diagnosis and treatment of medical and surgical diseases of large domestic animals.

VETCS 566 Radiographic Techniques
Fall, first five weeks. 1 credit. Required of all third-year veterinary students. Others with appropriate background by permission of the instructor. N.L. Dykes (coordinator); V.T. Rendano.

An introductory course designed to familiarize the student with both the production of radiographs and their interpretation. Topics covered include radiographic equipment, x-ray generation, and radiation safety. A systematic approach to the radiographic evaluation of small, large, and exotic species is presented as well as basic principles of diagnostic ultrasound, nuclear medicine, and radiation therapy.

VETCS 567 Clinical Nutrition
Fall. 2 credits. Required of all third-year veterinary students. Others by permission of the instructor. Letter grades only. F.A. Kallfelz and A. Reynolds.

The first third of this course is devoted to a review of basic principles of nutrition and specific nutritional requirements of both companion and farm animals. Students are given an introduction to ration evaluation and formulation of rations for normal animals. Computerized approaches to ration evaluation and formulation are demonstrated. In addition, the special nutritional needs of newborn and growing animals; special nutrient requirements for work, production, and reproduction; and nutritional considerations for older animals are considered. The second two-thirds of the course covers clinical nutrition. Nutritionally induced diseases due to nutrient deficiencies and excesses as well as metabolic diseases are considered. Dietary management of nutritionally induced, degenerative, and other diseases is stressed. Case material from the Teaching Hospital is used as appropriate to demonstrate these principles.

VETCS 568 Foundations of Clinical Science I
Fall. 2 credits. Limited to first-year veterinary students. S-U grades only. C.L. Guard; W.E. Hornbuckle (coordinator); J.E. Saidla and other faculty.

The purpose of this course is to begin to build the fundamental clinical skills of physical examination and diagnostic reasoning and to relate them to concurrent studies in anatomy and physiology. Practical laboratories give students the opportunity to practice these skills, and the participation of both clinical and basic science faculty members emphasizes the interdependence of the basic and clinical sciences.

VETCS 569 Foundations of Clinical Science II
Spring. 2 credits. Limited to first-year veterinary students. Prerequisite: VETCS 568. S-U grades only. C.L. Guard; W.E. Hornbuckle (coordinator); other faculty. A continuation of VETCS 568.

VETCS 570 Theriogenology Service (Selective) Students enrolled Term I.
Spring. 2 or 4 credits. Limited to fourth-year veterinary students. Letter grades only. B.A. Ball; P. Daels; R.O. Gilbert; R.B. Hillman (coordinator); V.N. Meyers-Wallen.

A selective clinical service rotation, this course is offered to provide additional hands-on experience in all phases of theriogenology. Equine reproductive experience is gained in teasing, rectal palpations, ultrasound scanning, semen collection and evaluation, natural breeding, and artificial insemination. Additional techniques emphasized include taking and evaluation of endometrial biopsies, endometrial culturing, and collection and evaluation of endometrial cytology smears. Bovine experience includes weekly trips to the slaughterhouse, where rectal palpation findings

can be compared to actual structures present in recovered tracts. Additional experience in rectal palpation is gained by following cyclic changes in assigned cows in the college dairy herd as well as by participating in herd-health palpations. Hands-on experience is provided in superovulation and embryo-recovery techniques, as well as in surgical deviation of the penis to provide teaser bulls. Trips to the Department of Animal Science sheep and swine barns allow observation of breeding programs and provide experience in castration, docking, clipping milk teeth, notching ears, etc. Weekly seminars are presented on current topics in theriogenology.

VETCS 572 Senior Seminar
Fall and spring. 1 credit. Required of all fourth-year veterinary students. First-, second-, and third-year students and all staff members are also invited and encouraged to attend. S-U grades only. F.H. Fox, chair of the Senior Seminar Committee.

The aim of this course is to give the student the responsibility and opportunity of selecting and studying disease entity on the basis of a case or series of cases or to give the student the responsibility and opportunity of conducting a short-term, clinically oriented research project under the direction of a faculty member. In either case, an oral report will be presented at a weekly seminar. A written report will also be submitted at the time of the seminar. All participants are encouraged to foster an atmosphere in which discussion, exchange of ideas, and the airing of controversial opinions might flourish.

VETCS 574 Large Animal Surgery Service
Fall, spring, and summer. 4 credits. Limited to fourth-year veterinary students. Letter grades only. R.P. Hackett and others.

This clinical rotation is structured to provide supervised clinical experience in the practice of large animal surgery. Under the direction of faculty and house staff, students participate in the diagnosis, surgical treatment, and care of patients presented to the Large Animal Clinic. Training through patient care is supplemented by formal rounds and by didactic instruction.

VETCS 575 Ambulatory Service
Fall, spring, and summer. 4 credits. Required of all fourth-year veterinary students. Not open to students from other colleges. Letter grades only. F.H. Fox; C.L. Guard (coordinator); G.D. Mechor; M.C. Smith; M.E. White.

A clinical service rotation in which students accompany ambulatory clinicians on farm and stable calls and learn the skills and procedures necessary for operation of a modern veterinary practice offering primary care to large animal clients. Routine herd health visits are conducted for cattle, horses, sheep, goats, and swine. Reproductive evaluations (including pregnancy and fertility examinations), nutritional evaluation, and disease prevention are stressed. Herd health programs also include vaccinations, parasite control, mastitis prevention, and routine procedures such as castration and dehorning. With appropriate herds, analysis of computerized performance data is conducted and discussed with the owner. In addition to assisting with routine scheduled work, students participate in diagnosis and medical or surgical treatment of ill or injured animals. This includes rotating assignments for night and weekend emergency duty.

VETCS 578 Clinical Anesthesiology
Fall, spring, and summer. 3 credits. Limited to fourth-year veterinary students. Letter grades only. R.D. Gleed (coordinator), A. Looney and J.W. Ludders.

This course is designed to provide clinical experience in the use of anesthetics in both small companion animals, horses, and some food animals. The students participate in the process of selecting suitable anesthetic techniques for cases in the Veterinary Medical Teaching Hospital and then implement those techniques under the supervision of residents and faculty. The goal is that students learn the skills necessary to perform safe anesthesia in a modern veterinary practice.

VETCS 579 General Medicine and Surgery
Spring. 4 credits. Required of all second-year veterinary students. Prerequisite VETPA 536. Letter grades only. T.J. Divers and W.E. Hornbuckle (coordinators); with H.J. Harvey and other faculty.

An introduction to veterinary internal medicine and surgery. Emphasis is placed on the comparative and pathophysiologic aspects of disease, the clinical manifestations of organ system dysfunction, the principles of aseptic surgical technique, the healing of incised and traumatic wounds, and the prevention and treatment of surgical complications. This course is designed to provide an introduction to the basic concept of medicine and surgery. Emphasis is placed on history-taking, clinical signs associated with particular disorders of each body system, and on problem-oriented diagnosis. The pathophysiologic mechanisms causing the clinical signs will be presented. The course will provide some integration of diagnostic testing to complement the clinical signs. The laboratories that accompany the lectures in the course are intended to provide an in-depth examination of each body system and demonstrate basic skills necessary for the practice of surgery.

VETCS 580 Radiology Service
Fall, spring, and summer. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. N.L. Dykes (coordinator); V.T. Rendano.

A two-week clinical rotation in the Radiology Section of the Veterinary Medical Teaching Hospital. Students will be exposed to radiology, ultrasound, and nuclear medicine imaging techniques used in the evaluation of animal patients in the Veterinary Medical Teaching Hospital. Under guidance of radiology faculty and technical staff, students obtain and interpret radiographic and ultrasonographic studies. Two three-hour laboratory sessions are given to allow hands-on experience in patient positioning and radiographic technique. An autotutorial teaching film file is used to familiarize students with radiographic examples of common diseases of large and small animal

species. Small-group discussions are scheduled to present and discuss current cases. Radiation safety as it regards the veterinary practitioner is emphasized.

VETCS 581 Animal Nutrition
Fall. 2 credits. Limited to first-year veterinary students. Letter grades only. H.F. Hintz.

Functions of nutrients, signs of deficiencies and excesses of nutrients, sources of nutrients, and situations that are likely to cause deficiencies or excesses are discussed during the first part of the course. The identification and evaluation of feedstuffs and supplements are stressed. During the last part of the course, feeding programs for beef cattle, dairy cattle, horses, swine, cats, and dogs will be discussed. Practice in ration formulation is provided.

VETCS 582 Large Animal Surgical Exercises
Spring. 2 credits. Required of all third-year veterinary students. Not open to others. S-U grades only. S.L. Fubini (coordinator) and other large animal surgery and anesthesiology faculty.

This practical course is designed to impart fundamental skills in preoperative and postoperative care, anesthesia, aseptic technique, instrument and tissue handling, and surgical skills by closely supervised operations on large domestic animals and cadaver specimens.

VETCS 583 Small Animal Medicine and Surgery
Fall. 5 credits. Required of all third-year veterinary students. Not open to others. Prerequisites: VETPA 536, VETPA 571, and VETPR 528. Letter grades only. Faculty of medicine and surgery sections; J.A. Flanders and N.S. Moise (coordinators).

A lecture format is used to present the major medical and surgical diseases of dogs and cats. The course material is divided into organ system blocks and includes ophthalmology, cardiology, urogenital medicine and surgery, gastrointestinal medicine and surgery, musculoskeletal diseases and surgery, neurosurgery, endocrinology and endocrine surgery, dermatology, respiratory medicine and surgery. Emphasis is placed on diagnosis (clinical signs, laboratory findings) and treatment. This course is continuous with VETCS 584 in the spring.

VETCS 584 Small Animal Medicine and Surgery
Spring. 7 credits. Limited to third-year veterinary students. Letter grades only. Faculty of medicine and surgery sections; J.A. Flanders and N.S. Moise (coordinators).

A continuation of VETCS 583.

VETCS 586 Small Animal Surgical Exercises
Spring. 2 credits. Limited to third-year veterinary students. S-U grades only. H.J. Harvey and other small animal surgery and anesthesiology faculty.

This course provides the opportunity for students to practice basic surgical skills. Three procedures (celiotomy, thoracotomy, orthopedic approach) were chosen as the core exercises of the course. These procedures encompass maneuvers with widespread application to many types of surgery. The schedule is constructed so that each student will be the primary surgeon for each core exercise.

VETCS 589 Small Animal Medicine and Community Practice Services
Fall, spring, and summer. 6 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. S.C. Barr; S.A. Center; W.J. Gould; W.E. Hornbuckle; N.S. Moise; J.F. Randolph (coordinator).

Two medical services and a community practice service. The Small Animal Medicine and Community Practice Services are structured to provide supervised clinical experience in the practice of small companion-animal medicine. The course is conducted in the Small Animal Clinic of the Veterinary Medical Teaching Hospital. Students interact directly with clients presenting their pets for primary or referral medical care. Under the supervision of the clinical faculty and staff, the students are expected to formulate and carry out plans for the diagnostic evaluation and medical management of these patients. After review, students then explain their plans to the clients and provide follow-up care and management of these patients.

VETCS 591 Small Animal Surgery Service
Fall, spring, and summer. 4 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. Small animal surgery faculty, H.J. Harvey (coordinator).

A clinical service rotation, this course exposes the student to the practice of surgery under hospital conditions. Students participate in the diagnostic techniques, the planning of therapy, and the daily care of dogs, cats, and exotic species under the direction of a faculty veterinarian. Students assist experienced surgeons in the operating room and, with house-officer supervision, are responsible for patients undergoing elective ovariohysterectomy or castration. Client communications and the basics of efficient practice are also emphasized.

VETCS 593 Ophthalmology Service
Fall, spring, and summer. 2 credits. Required of all fourth-year students. Limited to veterinary students. Letter grades only. T.J. Kern and R.C. Riis (coordinator).

This course combines clinical experience with beginning skills in diagnostic ophthalmology. Students learn how to apply the diagnostic tests. The feeling of performing a good ocular examination is the goal of this rotation. Confidence in using direct and indirect ophthalmoscopes, slit lamps, tonometers, goniolenses, conjunctival cytology, and surgery comes with practice introduced in this rotation. The first week requires an introductory orientation tape in the Autotutorial Center. Every morning, this rotation includes a surgical procedure, and every afternoon is scheduled with consultations. A high percentage of the consultations are referral cases that usually challenge the service, although adequate routine case material is presented to prepare most senior students for practice.

VETCS 594 Large Animal Medicine Service
Fall, spring, and summer. 3 credits. Required of all fourth-year students. Not open to students of other colleges. Letter grades only. W.C. Rebhun (coordinator) and other large animal medicine faculty.

This clinical rotation provides a variety of interesting equine and bovine medical cases that will allow students to apply their diagnostic and therapeutic knowledge. In the process, students will be able to acquire the history and select and perform diagnostic tests and therapeutics under the direction of the house staff and faculty. There is also opportunity for client interaction. During daily ward rounds, differential diagnosis and pathophysiology and treatments of each case are discussed. During small-group rounds, common diseases of horses and cattle and commonly used diagnostic procedures are reviewed.

VETCS 596 Opportunities in Veterinary Medicine
Fall, spring, and summer. Variable credits. S-U grades only. D.F. Smith (coordinator).

This course provides opportunities for students after the end of the third year to explore professional areas not available through the regular curriculum. Blocks of two to four weeks are usually spent at other teaching hospitals, research laboratories, or zoological facilities. Student proposals are submitted to the associate dean for veterinary education for review and approval. On-site supervisors of the block act as ex-officio faculty members and are required to formally evaluate each student.

VETCS 598 Dermatology Service
Fall, spring, and summer. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. W.H. Miller, Jr. and D.W. Scott.

During this clinical rotation, students participate in the diagnosis and management of skin disorders in small and large animals. Patients are examined by appointment and through consultation with other hospital services.

VETCS 600 Journal Reading I (Selective)
Fall and spring. 1 credit. Limited to veterinary students. S-U grades only. D.F. Smith.

This small-group tutorial is designed to familiarize veterinary students with the broad range of veterinary, medical, and general scientific literature in a way that promotes the development of permanent reading habits, critical reading skills, and methods for retrieval of professional and scientific information.

VETCS 601 Dentistry (Selective)
Fall and spring. 1 credit. Open to all second-, third- and fourth-year veterinary students. S-U grades only. J.E. Saidla.

This course introduces students to the basics of small animal dentistry. Practical aspects will be emphasized. Laboratory sessions will follow the specific topic lecture and will be hands-on experiences. Working in pairs, students gain experience in technical aspects of instrumentation and develop some of the manipulative skills necessary to perform basic dental procedures. Canine and feline skulls and heads are used in the laboratory sessions; live animals are not used.

VETCS 603 Reproductive Examination of the Mare (Selective)
Fall. 1 credit. Limited to third year veterinary students. Maximum enrollment, 24 students. S-U grades only. P.F. Daels.

Students meet 1.5 hours a week for eight weeks. The genital tract of nonpregnant and pregnant mares are examined per rectum. Findings will be discussed in light of the animal's reproductive status. Each week, a hypothetical case is presented to students and discussed during the course of the laboratory. Current class material from the core course (VETCS 562-Theriogenology II) and its application to animals in the herd is discussed. Students are also introduced to the use and interpretation of ultrasonography during the final session.

VETCS 616 Research Opportunities in Veterinary Medicine (Selective)
Fall, spring, summer, and January. 1-4 credits. By permission of the instructor. S-U grades only. Individual faculty decision. Need Option.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

VETCS 664 Introduction to Epidemiology (Graduate)
Fall. 3 credits. Prerequisites: Statistics and Biometry 601 (College of Agriculture and Life Sciences) may be taken concurrently. S-U grades optional. H.N. Erb (coordinator); Y.T. Gröhn, H.O. Mohammed, J.M. Scarlett.

Lectures and discussion deal with the fundamentals of epidemiology. Current topics in epidemiology from the fields of nutrition, infectious and chronic diseases, occupational medicine, and veterinary medicine are reviewed to illustrate the principles and practice of epidemiology.

VETCS 665 Study Designs (Graduate)
Spring. 2 credits. Prerequisites: VETCS 664 and Statistics and Biometry 601 (College of Agriculture and Life Sciences). S-U grades optional. H.N. Erb; Y.T. Gröhn; H.O. Mohammed (coordinator); J.M. Scarlett.

Design and interpretation of cross-sectional, case-control, and cohort studies (including controlled clinical trial) are covered. Design issues include sample size, bias, and relative advantages and disadvantages.

VETCS 666 Advanced Methods in Epidemiology (Graduate)
Fall. 3 credits. Prerequisites: VETCS 665 and Statistics and Biometry 602 (College of Agriculture and Life Sciences). S-U grades optional. H.N. Erb; Y.T. Gröhn (coordinator); H.O. Mohammed; J.M. Scarlett.

Concepts introduced in VETCS 664 and VETCS 665 are further developed, with emphasis on statistical methods. Topics include interaction, effect modification, stratified analysis, matching and multivariate (logistic regression) methods, survival analysis, and strategies for the analysis of epidemiologic data.

VETCS 676 Special Problems in Large Animal Surgery (Selective)
Fall or spring. Credit to be arranged. Limited to veterinary students. By permission of the instructor. Surgery faculty.

VETCS 677 Special Problems in Theriogenology (Selective)
Fall and spring. Credit to be arranged. Limited to veterinary students. By permission of the instructor. Theriogenology faculty.

VETCS 678 Fundamental Techniques in Bovine Embryo Transfer (Selective)
Spring. 1 credit. Limited to third- and fourth-year veterinary students. S-U grades only. R.B. Hillman.

The major emphasis of this course is on bovine embryo transfer, but information is also provided on equine, ovine, and caprine embryo transfer. Freezing and micromanipulation are also considered. Some class work is in the laboratory.

VETCS 679 Dairy Herd Management and Health (Selective)
Fall. 2 credits. Intended for third- and fourth-year veterinary students. Maximum enrollment, 20 students. S-U grades only. C.L. Guard.

This course covers areas of dairy herd management in the context of production efficiency and the role of the veterinarian as management consultant. Major subject areas include nutrition, mastitis, reproduction, and herd-replacement raising. Means of evaluating performance in those key areas are stressed. Other related topics include relevant data acquisition and analysis, a survey of housing and feeding facilities, and milking-equipment designs and troubleshooting.

VETCS 680 Poisonous Plants (Selective)
Fall. 1 credit. Students from other colleges by permission of the instructor. S-U grades only. R.B. Hillman and M.C. Smith (coordinator).

Field trips demonstrate toxic plants growing in natural or cultivated settings. Lectures address economically important poisonous plants native to the United States. Information presented includes plant identification, natural habitat, toxic principles, clinical signs of toxicity, and treatment and prevention of poisoning in animals. Some of the major toxic principles found in plants and considered in detail in the course are nitrates, cyanide, oxalates, photodynamic agents, alkaloids, and mycotoxins.

[VETCS 681 Horse Health Management (Selective)
Spring, even-numbered years. 1 credit. Intended for third- and fourth-year veterinary students. T.L. Brant; C.A. Collyer; R. B. Hillman (coordinator).

Prevention of equine diseases by management practices, nutrition, and vaccination procedures is emphasized. The reproductive aspects of a breeding farm are detailed, starting with the need for complete health records and including the normal reproductive cycle, detection of estrus, breeding techniques, use of lighting programs and hormones, stallion fertility and artificial insemination. Diagnosis, treatment, and management of problem mares are included. Pregnancy determination and care of the pregnant mare are covered, as are natural and induced parturitions. Care of the newborn foal and diagnosis, treatment, and prevention of foal diseases are also included.]

VETCS 683 Elementary Biostatistics (Selective)
Spring. 1 credit. Intended for veterinary students. Others with permission of the instructor. Minimum enrollment, 10 students. H.N. Erb.

The course takes a practical approach to elementary statistics for people who will read statistics and possibly do some statistics on their own. Topics include descriptive statistics and some of the simpler, two-variable tests of association.

VETCS 684 Horse Lameness (Selective)
Spring. 1 credit. Limited to third-year veterinary students. S-U grades only. N.G. Ducharme (coordinator) and A.J. Nixon.

This course is designed to acquaint third-year students with the advanced equine lameness problem. The course consists of lectures and laboratories stressing lameness as it can be evaluated in private practice. Laboratory session stresses local anesthesia, ultrasound, and radiographic techniques.

VETCS 685 Introduction to Practice Management (Selective)
January. 2 credits. Minimum enrollment, 5 students. S-U grades only. D.P. Gallagher.

This minisemester selective course is intended to introduce students to selected aspects of veterinary practice management through readings, case studies, and discussions. Specific topics to be explored are arranged by mutual agreement between the class and the instructor.

VETCS 686 Goats: Management and Diseases (Selective)
Spring. 1 credit. Intended for second-, third-, and fourth-year veterinary students. S-U grades only. M.C. Smith.

Infectious, parasitic, nutritional, and toxic diseases of goats are considered. Appropriate herd-health programs to prevent or control these conditions are outlined. Procedures demonstrated or discussed include anesthesia, dehorning, castration, tattooing, foot care, and various obstetrical manipulations. Physiology, nutrition, and management are considered as they pertain to maintaining health and productivity of the goats.

VETCS 688 Special Problems in Small Animal Medicine (Selective)
Fall and spring. Credit to be arranged. Limited to veterinary students. By permission of the instructor. Medicine faculty.

VETCS 689 Special Problems in Small Animal Surgery (Selective)
Fall and spring. Credit to be arranged. Limited to fourth-year veterinary students. By permission of the instructor. Surgery faculty.

VETCS 690 Veterinary Dermatology (Selective)
Spring. 1 credit. Limited to veterinary students. Minimum enrollment, 10 students. S-U grades only. W.H. Miller, Jr. and D.W. Scott.

This course emphasizes dermatologic conditions of small and large animals not covered in the core curriculum. Course grade is based on a final examination.

VETCS 691 Advanced Large Animal Internal Medicine (Selective)
Spring. 1 credit. Limited to fourth-year veterinary students. W.C. Rebhun and other large animal medicine faculty.

Problem-oriented and systems approach to the major body systems of horses and cattle are discussed in relation to diseases in large animal practice. Emphasis is on problem solving, formulation of differential diagnoses, intelligent employment of selected ancillary aids, and rational therapy.

[VETCS 694 Diseases of Exotic Pets
Spring, even-numbered years. 1 credit. Intended for second-, third-, and fourth-year veterinary students. Others by permission of instructor. W.J. Gould.

A potpourri of topics relating to exotic animal pets and sick or injured wildlife is covered. Speakers from the college and surrounding area discuss many subjects of practical clinical interest.]

VETCS 695 Advanced Equine Surgical Techniques (Selective)
Spring. 1 credit. Limited to third-year veterinary students. Letter grades only. S.L. Fubini (coordinator) and other large animal surgeons.

This course consists of four laboratories performing advanced surgical procedures on ponies and cadaver specimens. Procedures in this laboratory are performed primarily at referral surgical centers. It is the intent of this course not to make the students proficient in these procedures, but to familiarize them with some specialized surgical techniques and to make them more enlightened referring practitioners. The course, therefore, is intended for those students anticipating equine practice after graduation. This course is offered the last four weeks of the spring semester, following VETCS 582.

VETCS 696 Basic and Therapeutic Horseshoeing (Selective)
Spring. 1 credit. Limited to veterinary students. S-U grades only. M.J. Wildenstein.

This course covers what veterinarians need to know about horseshoeing. Students receive hands-on training in pulling shoes and trimming the equine hoof. Basic hoof care, shoeing, and shoe types will be discussed. Problems of the hoof that are best treated by a cooperative effort between farrier and veterinarian—such as laminitis, navicular, and foal limb deformities—will be discussed in length. This course gives a solid introduction to farriery—a must for those considering a career with horses.

VETCS 697 Advanced Techniques in Food Animal Surgery (Selective)
Spring. 1 credit. Limited to third year veterinary students. Letter grades only. S.L. Fubini (coordinator) and other large animal surgeons.

This course consists of four laboratories performing advanced surgical procedures on small ruminants, cadaver specimens, and adult cattle. Procedures in this laboratory are performed primarily at referral surgical centers. It is the intent of this course not to make the students proficient in these techniques, but to familiarize them with some specialized surgical techniques and to make them more enlightened referring practitioners. The course therefore is intended for those students anticipating food animal practice after graduation. This course is offered the last four weeks of the spring semester, following VETCS 582.

VETCS 698 Senior Seminar Selective (Selective)
Fall and spring. 1 credit. First-, second-, and third-year veterinary students or by permission of instructor. S-U grades only.

Attendance at 14 of the senior seminar sessions presented during the academic year constitutes acceptable completion of this course.

VETCS 699 Llama Tutorial (Selective)
Fall and spring. 1 credit. Limited to third- and fourth-year veterinary students. S-U grades only. M.C. Smith.

This autotutorial or group tutorial course covers common problems of llamas and alpacas. Each week, participants will be provided with a brief case description and a set of sample study questions. Reference will be made to textbooks, journal articles, videotapes, and (if available) a teaching llama to assist students in finding the answers to the questions efficiently. Grading is based on an oral exam.

VETCS 700 Pathophysiology of Gastrointestinal Surgery (Graduate)
Fall, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.

VETCS 701 Pathophysiology in Orthopedic Surgery (Graduate)
Spring, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.

[VETCS 702 Pathophysiology of Cardiopulmonary Surgery (Graduate)
Fall, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.]

[VETCS 703 Surgical Principles and Surgery of the Integumentary System (Graduate)
Spring, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.]

[VETCS 704 Pathophysiology of Urogenital Surgery (Graduate)
Fall, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.]

VETCS 705 Animal Pain and Its Control (Graduate)
January. 2 credits. By permission of the instructor. C.E. Short.

This course provides residents and graduate students with fundamental and applied concepts of animal pain, the cerebral and cardiopulmonary responses to pain, and medications used for its control. The subject material will be covered both by lectures and by group discussion sessions.

[VETCS 706 Pathophysiology of Neurologic Surgery (Graduate)
Spring, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only.]

VETCS 766 Graduate Research (Graduate)
Fall, spring, and summer. Credit and hours to be arranged. By permission of the graduate faculty member concerned. S-U grades only. Epidemiology faculty.

VETCS 768 Master's-Level Thesis Research (Graduate)
Fall or spring. 1-6 credits. Epidemiology faculty.

This course enables graduate students in the Section of Epidemiology to receive graduate research credits for master's-level thesis research.

VETCS 769 Doctoral-Level Thesis Research (Graduate)
Fall or spring. 1-6 credits. Epidemiology faculty.

This course enables students in the Section of Epidemiology to receive graduate research credits for doctoral-level thesis research.

VETCS 799 Independent Studies in Epidemiology (Selective)
Fall and spring. 1-3 credits. H.N. Erb; Y.T. Gröhn; H.O. Mohammed; J.M. Scarlett.

The purpose of this course is to investigate an epidemiologic topic with one of the instructors. It provides experience in problem definition, research design, and the analysis of epidemiologic data.

Diagnostic Laboratory

Donald H. Lein, director
206 Diagnostic Laboratory
607-253-3900

Associate professors: E.J. Dubovi, J.D. Henion, R.H. Jacobson, D.H. Lein, G.A. Maylin, T.J. Reimers, P.M. Sears, S.J. Shin; assistant professor: Y.F. Chang.

VETDL 531 Regulatory Medicine
Spring, first seven weeks. No credit. Required of all third-year veterinary students. S-U grades only. J. Huntley and J. Huse.

A review of animal and poultry diseases that are reportable to the New York State Department of Agriculture and Markets in preparation for taking the USDA accreditation examination.

[VETDL 611 Mastitis (Selective)
January, 6-8 hours per day for three weeks. 3 credits. Limited to second-, third-, and fourth-year veterinary students. Letter grades only. P.M. Sears and staff.

This course covers the causes, diagnosis, treatment, and prevention of bovine mastitis. The role of management practices is stressed. The course includes lectures, readings, discussions, laboratory exercises, and farm visits as part of the New York State Quality Milk Services Program–Mastitis Control Program.]

VETDL 700 Special Projects in Diagnostic Endocrinology (Selective)
Fall and spring. 1-3 credits. By permission of the instructor. Letter grades only. T.J. Reimers.

An independent-study course. Students have opportunity to research a particular topic in diagnostic/clinical endocrinology of animals.

VETDL 701 Special Projects in Infectious Diseases (Selective)
Fall and spring. 1-3 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

This course provides laboratory experience with attention to specific aspects of infectious disease problems.

VETDL 702 Special Topics in Infectious Diseases (Selective)
Fall and spring. 1-3 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

The objective of this course is to offer a broad exposure to various aspects of infectious diseases.

VETDL 703 Doctoral-Level Thesis Research (Graduate)
Fall and spring. 6-9 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

Research leading to a Ph.D. degree.

VETDL 704 Master's-Level Thesis Research (Graduate)
Fall and spring. 1-3 credits. By permission of the instructor. S-U grades only. Diagnostic Laboratory faculty.

Research leading to a M.S. degree.

Microbiology, Immunology, and Parasitology

Roger J. Avery, chair
616A Veterinary Research Tower
607-253-3400

Professors: D.F. Antczak, M.J. Appel, R.J. Avery, R.G. Bell, S.G. Campbell, R.R. Dietert, G. Lust, D.D. McGregor, F.M. Noronha, F.W. Scott, A.J. Winter; associate professors: J.W. Casey, J.A. Marsh; assistant professors: J.A. Appleton, D.D. Bowman, C.R. Parrish, E.J. Pearce; senior lecturer: D.F. Holmes, L.E. Winter; instructor: M. Barr; teaching support specialist: M.F. Frongillo

VETMI 315 Basic Immunology Lectures (also Biological Sciences 305) (Undergraduate)
Fall. 3 credits. Strongly recommended: basic courses in microbiology, genetics, and biochemistry. Letter grades only. A.J. Winter.

A survey of immunology, with emphasis on the biological functions of the immune response.

[VETMI 317 Pathogenic Virology (also Biological Sciences 308) (Undergraduate)
Spring, even-numbered years. 4 credits. Intended primarily for graduate and

undergraduate microbiology majors. Limited to 40 students. Prerequisites: Microbiology 290 and 291 (College of Agriculture and Life Sciences). Strongly recommended: VETMI 315 (Basic Immunology Lectures). Lecture only–2 credits. Lecture and laboratory–4 credits. J.W. Casey and L.E. Winter.

The Pathogenic Virology course will cover properties of the virion, viral-host interactions, strategies for gene regulation, and mechanism of pathogenicity. Selected viral infections that result in immune dysfunction and neoplasia will be highlighted in the context of current approaches to prevent or reduce the severity of disease. Laboratories will emphasize the isolation and culture of viral pathogens as well as in vitro systems for studying the pathogenesis of, and the immune response to, infectious agents. Discussions will be included in the laboratory and guest speakers will present current approaches to identifying and characterizing viral agents. Additionally, each student enrolled in the laboratory will present a descriptive summary on a viral system and discuss a research approach to solve a particular problem.

This course listing has been modified so that Pathogenic Virology will be offered separately from Pathogenic Bacteriology. These courses will be given in alternate years.]

[VETMI 318 Pathogenic Bacteriology and Mycology (also Biological Sciences 304) (Undergraduate)
Spring, odd-numbered years. Lecture only, 2 credits. Lecture and laboratory, 4 credits. Intended primarily for graduate and undergraduate microbiology majors. Limited to 20 students. Prerequisites: Micro 290 and 291 (College of Agriculture and Life Sciences). Strongly recommended: VETMI 315 and 316. Letter grades only. Not offered 1993.

This is a course in medical microbiology, covering pathogenic bacteriology and mycology. Lectures in bacteriology and mycology cover the major groups of bacterial pathogens and some of the important virulence mechanisms, as well as highlight certain aspects of the normal flora, antibiotic therapy, and drug resistance that are relevant to the pathogenesis of bacterial disease. Laboratories emphasize techniques for isolation and culture of bacterial and fungal pathogens as well as demonstrate tissue culture and animal models for studying the pathogenesis of, and the immune response to, infectious agents. One important principle emphasized in both portions of the course is that disease is the product of the interaction of the host, pathogen, and environment.]

[VETMI 331 Medical Parasitology (Undergraduate)
Fall, alternate years. Not offered 1992. 2 credits. Prerequisite: zoology or biology. Letter grades only. M.F. Frongillo and D.D. Bowman.

A systematic study of arthropod, protozoan, and helminth parasites of public-health importance, with emphasis on epidemiologic, clinical, and zoonotic aspects of these parasitisms.]

VETMI 510 Veterinary Parasitology
Fall. 4 credits. Limited to second-year veterinary students. Prerequisites: zoology and biology. Letter grades only. D.D. Bowman, E.J. Pearce, M.F. Frongillo.

A systematic study of arthropod, protozoan, and helminth parasites of vertebrate animals, with particular emphasis on the bionomics, epidemiology, and control of parasitisms of veterinary and public-health importance. Laboratories consist of practical exercises in the antemortem and postmortem diagnosis of arthropod, protozoan, and helminth parasitisms of domestic animals and the interpretation of their pathogenetic significance.

VETMI 515 Veterinary Immunology
Spring. 2 credits. Limited to first-year veterinary students. Letter grades only. J.A. Appleton and D.F. Holmes.

The objective of the lectures is to give the veterinary student a general outline of the mammalian and avian immune response. Emphasis will be on basic principles, using examples from domestic animals, thereby stressing the applications of immunology to veterinary medicine. Laboratories illustrate and enlarge upon the concepts presented in the lectures and give the student first-hand experience of the simple immunologic tests commonly used in veterinary practice. The more complex tests are presented as demonstrations.

VETMI 516 Infectious Diseases I: Bacteriology and Mycology
Fall. 4 credits. Limited to second-year veterinary students. Letter grades only. S.G. Campbell (coordinator), L.E. Winter.

The lectures are intended to provide an understanding of the pathogenesis of bacterial and mycotic infections in domestic animals. Thus the student is given the basis for an informed approach to the symptomatology, diagnosis, control, treatment, and prevention of the more important bacterial and fungal diseases.

Laboratory exercises are concerned with the isolation, culture, and identification of the major groups of veterinary bacterial and fungal pathogens as they occur in clinical material. Students have the opportunity to collect and culture specimens and make presumptive bacteriologic or fungal diagnoses based on their own investigations in the laboratory and the case histories involved. The laboratory exercises are supplemented with small group discussion-demonstration sessions on interesting cases and diagnostic material.

VETMI 517 Infectious Diseases II: Virology and Viral Diseases
Fall. 2 credits. Required of all second-year veterinary students. Letter grades only. F.W. Scott.

This course covers viruses that produce important diseases in animals. The first third of the term covers general virology, and the remaining two-thirds covers viral diseases, including the basic properties of the virus, how the virus produces disease, and how the host responds to the virus infection. Virologic and serologic procedures important for the diagnosis of various virus diseases are discussed.

VETMI 518 Infectious Diseases III: Infectious and Zoonotic Diseases
Spring. 2 credits. Required of all second-year veterinary students. Others by permission of the instructor. Letter grades only. L.E. Winter, zoonotic diseases, (coordinator); M.J. Appel, foreign-animal diseases.

This course describes the etiology, pathogenesis, clinical signs, differential diagnosis, methods of spread, reservoir hosts, methods of prevention and control of diseases transmissible to man, and foreign-animal diseases that resemble indigenous infectious diseases or present serious economic or public health threats to the United States. Sections on food-borne, water-borne, and occupational diseases are included.

VETMI 605 Special Projects in Microbiology (Selective, Undergraduate)
Fall and spring. Credit to be arranged. By permission of the instructor. Prerequisite: a good background in microbiology or immunology. S-U grades only. Microbiology staff.

Preferably, students should have background in pathogenic microbiology and immunology. The course normally provides an opportunity for the student to work in a research laboratory or carry out a special project under supervision.

VETMI 606 Small Animal Infectious Diseases (Selective)
Spring. 2 credits. Prerequisite: three semesters of the veterinary-college curriculum or permission of the instructor. S-U grades only. F.W. Scott and guest lecturers.

This course is designed to give the future small-animal practitioner a greater understanding of the infectious diseases of the dog and cat. Emphasis is on etiology, pathogenesis, diagnosis, treatment, and prevention. The diseases covered include the diseases of dogs and cats that are caused by viruses, bacteria, fungi, and protozoa.

VETMI 607 Virus Diseases of Cattle (Selective)
Fall, even-numbered years. 1 credit. Limited to third- and fourth-year veterinary students. Open to graduate students in the veterinary college by permission of the instructor. S-U grades only. F.H. Fox; J.H. Gillespie; J.M. King and guest lecturers.

This course is designed to give the future bovine practitioner an understanding of the viral diseases of cattle raised in the United States. Emphasis is on clinical signs and diagnosis, etiology, pathogenesis, pathology, control and prevention (including maternal immunity), vaccination, and other therapy. A clinician, a pathologist, and a microbiologist are in attendance at every lecture to cover each aspect of the disease as it relates to their discipline. This assures complete coverage of each topic through appropriate interaction and integration of the subject matter.

VETMI 609 A Health Program for Sheep (Selective)
Spring. Open to nonveterinary students by permission of the instructor. S.G. Campbell.

The objective of the course is to provide the student with sufficient information to set up a health program for sheep in the northeastern United States and elsewhere. The lectures (1 per week) describe the nutrition, husbandry, and the common ailments of sheep (parasitism, foot problems, pneumonia, etc.) to ensure that a control program can be formulated. During the laboratories (1 per week), students carry out selected practical exercises with sheep (handling, necropsy, docking and castrations, pregnancy diagnosis, etc.). In the semester-long field project, small groups of students formulate a health-maintenance program for an actual flock of sheep in Tompkins County.

VETMI 615 Research Opportunities in Veterinary Medicine (Selective)
Fall, spring, summer, and January. 1-4 credits. By permission of the instructor. Microbiology faculty.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

VETMI 651 Clinical Parasitology of Avian Species (Selective)
Spring. 1 credit. Open to third- and fourth-year veterinary students only. Maximum enrollment, 8 students. 1 lecture and 1 laboratory. S-U grades only. D.D. Bowman.

This course, consisting of 1 lecture and 1 laboratory per week, presents advanced veterinary students with the methods used in detecting, diagnosing, and treating parasitic infections of birds. Nondomestic species will be emphasized, but poultry specimens serve as examples because of availability and current knowledge. Arthropod, protozoan, and helminth parasites are considered.

[VETMI 700 The Biology of Animal Viruses (Selective, Undergraduate)
Fall, odd-numbered years. 2 credits. C.R. Parrish.

This course is a general introduction to the biology of animal viruses. A brief history of the concept and study of viruses, along with an overview and classification of the major viral groups will be given. Topics include the structures of viruses and their components, viral nucleic acids and genome replication strategies, selected examples of gene regulation mechanisms, structural and nonstructural viral proteins, and the interactions between viruses and cells.

Some traditional and recent examples of methods for the genetic analysis of viruses will be given. Further topics include evolution, variation, and selection of virus strains over time and during infections of host animals; traditional and novel approaches to vaccine development; and antiviral chemotherapy.]

VETMI 701 Models of Viral Pathogenesis
Fall, even-numbered years. 2 credits. Open to graduate students and most advanced undergraduates, with permission of instructor. C.R. Parrish.

In this course the most recent advances in viral pathogenesis will be examined by reviewing model systems. In the process, the mechanisms of cell and animal infection, epidemiology of

virus infections, spread between cells, disease mechanisms, roles of the immune response in enhancing or suppressing the disease, and examples of the mechanisms involved in different types of disease will be examined in a variety of systems.

The basic principles of virus taxonomy, structure, and replication will be briefly reviewed, to introduce the various virus groups and their special properties. An overview of the basic principles of viral pathogenesis and disease will be based around various texts, including *The Pathogenesis of Infectious Disease*, third edition, which will be used as a general introduction to the area. For studying model systems of viral disease, students will use *Concepts in Viral Pathogenesis*, volumes 1–3, which contains short and simple introductions to the various virus diseases. The most recent literature will be used to bring students up-to-date on these topics.

VETMI 702 Molecular Biology and Immunology of Host-Parasite Interactions
Fall, even-numbered years. Lecture, 2 credits. E.J. Pearce.

Primary objective of the course will be to make the student aware of the most important areas of research in contemporary parasitology. Lectures will focus on a broad range of parasites, with an emphasis on those of medical importance. Recently published research articles and reviews will be used as the basis to explore the issues of host invasion, evasion of host defense mechanisms by parasites, vaccination against parasitic infections, chemotherapy, vector biology, and molecular diagnosis. Biological processes especially well understood through work on parasites, such as RNA editing and GPI-anchor biosynthesis and structure, will be covered in detail.

[VETMI 705 Advanced Immunology Lectures (also Biological Sciences 705) (Graduate)
Spring, even-numbered years. 3 credits. Prerequisite: VETMI 315 Basic Immunology Lectures or permission of instructor. Letter grades only. A.J. Winter (coordinator) and staff.

Coverage at an advanced level of molecular and cellular immunology.]

VETMI 706 Immunology Seminar Series (Graduate)
Fall and spring. No credit. Required of all graduate students in the Field of Immunology. S-U grades only. E.J. Pearce and R.H. Jacobson.

Presentations of research investigations by Cornell faculty members, postdoctoral fellows, and graduate students in the Field of Immunology, and by invited speakers from other institutions.

VETMI 707 Advanced Work in Bacteriology, Virology, and Immunology (Graduate)
Fall and spring. Credit to be arranged. By permission of the instructor. Microbiology staff.

This course is designed primarily for graduate students with a good background in pathogenic microbiology and immunology. It may be elected by veterinary students who are properly prepared.

VETMI 708 Selected Topics in Animal Virology (Graduate)
Spring. 2 credits.

Lectures focus on the molecular biology of a few selected animal viruses. Important publications will provide the basis for a discussion of current models for virus replication and for host-viral interactions.

VETMI 709 Laboratory Methods of Diagnosis (Graduate)
Fall and spring. 1-3 credits by arrangement. By permission of instructor. Microbiology staff.

Instructions and practice in the application of microbiologic and serologic methods for the diagnosis of disease.

VETMI 710 Microbiology Seminar (Graduate)
Fall and spring. 1 credit. Required of all graduate students in the Department of Microbiology, Immunology, and Parasitology. S-U grades only. J.W. Casey.

VETMI 719 Immunology of Infectious Diseases and Tumors (also Biological Sciences 719) (Graduate)
Spring, odd-numbered years. 2 credits. Prerequisite: VETMI 315 Basic Immunology Lectures or permission of instructor. Letter grades only. A.J. Winter (coordinator) and staff.

Coverage at an advanced level of the immunology of diseases caused by selected bacterial, viral, protozoan, and helminthic parasites, and tumor immunology.

VETMI 720 Special Topics in Immunology: Macrophage Function and Regulation (Graduate)
Spring, odd-numbered years. 1 credit. Prerequisite: VETMI 315 Basic Immunology Lectures or permission of instructor. S-U optional. R.R. Dietert.

The role of the macrophage in host defenses.

VETMI 721 Special Topics in Immunology: Neuroendocrine-Immune Interactions (Graduate)
Spring, odd-numbered years. 1 credit. Prerequisite: VETMI 315 Basic Immunology Lectures or permission of instructor. S-U optional. J.A. Marsh.

Interactions of the immune and neuroendocrine systems in the development of the immune system and immunoregulation will be examined. The course format will be a combination of lectures, discussions, and paper presentations.

VETMI 722 Special Topics in Immunity: Nutrition and Immunity (Graduate)
Spring, odd-numbered years. 1 credit. Prerequisite: VETMI 315 Basic Immunology Lectures or permission of instructor. S-U optional. J.A. Marsh.

The effects of specific nutrient deficiencies, general calorie intake, and nutritional enhancements on immune development and function will be examined. The course format will be a combination of lectures, discussions, and paper presentations.

VETMI 737 Advanced Work in Animal Parasitology (Graduate)
Fall and spring. 1-3 credits by arrangement. For advanced undergraduate and graduate students. Letter grades only. D.D. Bowman and other faculty.

This course is intended for graduate students minoring in parasitology and for highly motivated veterinary students with interests in parasitology research.

VETMI 767 Immunoparasitology (Graduate)
Spring. 2 credits.

This course studies the immune response to representative helminth and protozoan parasites of vertebrate hosts. Emphasis is placed on the physiologic and immunologic relationships that play a role in regulation of parasitic infections. In vitro correlates of immunity to parasites, immunodiagnosis, and parasite-induced immunopotentiation and suppression are discussed.

VETMI 783 Seminars in Parasitology (Selective, Graduate)
Fall and spring. 1 credit. Open to veterinary students, graduate students minoring in the field of parasitology. Others by permission of the instructor. S-U grades only. D.D. Bowman.

This is a seminar series designed to acquaint students with current research in the field of parasitology. The range of topics is determined, in part, by the interests of those participating and may include such topics as the ecology of parasitism, parasite systematics, immunoparasitology, and parasitic diseases of plants and animals, including humans.

Pathology

Bendicht U. Pauli, chair
216 Veterinary Research Tower
607-253-3300

Professors: J.M. King, L.P. Krook, R.M. Lewis, R.R. Minor, B.U. Pauli, R.D. Phemister; associate professors: J.T. Blue, B.J. Cooper, T.W. French, F.W. Quimby. D.H. Schlafer, B.A. Summers, A. Yen; assistant professors: J.L. Guan, R.A. Levine, M.M. Suter

VETPA 535 Veterinary Pathology I
Fall. 4 credits. Required of all second-year veterinary students. Others by permission of the instructor. Prerequisites: VETA 502 and 503 or equivalent histology courses. B.J. Cooper (coordinator) and faculty.

A study of disease processes at the molecular and cellular levels: injury, adaptation, and repair, derangements in body fluids and blood flow, the inflammatory process, the nature and causes of neoplastic disease, and the relationship of genetics to disease are discussed as general processes at a mechanistic level.

VETPA 536 Veterinary Pathology II
Spring. 4.5 credits. Required of all second-year veterinary students. Not open to others. Prerequisite: VETPA 535. Letter grades only. D.H. Schlafer (coordinator) and faculty.

A systematic study of the diseases in each major organ system with emphasis on differential diagnostic features and the correlation of disturbed function with morphologic change.

VETPA 539 Introduction to Laboratory Animal Medicine
Spring. 1 credit. Required of all third-year veterinary students. Others by permission of the instructor. Prerequisites: Pathology 535 and 536. Letter grades only. F.W. Quimby and others.

An introduction to the biology and diseases of common laboratory animal species, including mice, rats, hamsters, guinea pigs, rabbits, and nonhuman primates. The etiology and pathogenesis of the most prevalent diseases are emphasized. Practical means of diagnosis and treatment are discussed. The course also provides an overview of the many aspects of laboratory animal medicine as practiced in academe, industry and research. Two optional laboratory sessions are offered in animal handling and clinical techniques.

VETPA 540 Pathology Service
Fall, spring, and summer. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. J.M. King (coordinator) and others.

This course involves the hands-on diagnostic necropsies of most mammalian species that come to the pathology necropsy room and of avian species that are admitted to the avian and aquatic animal medicine necropsy room. Students work in groups of three to five for the two-week rotation. Necropsies are performed under the guidance of pathology faculty, residents, or interns. Students prepare written reports of necropsies performed, review microscopic hematology and cytology slides, perform urinalyses, and discuss case studies.

VETPA 549 Laboratory Animal Clinical Rotation (Selective)
Spring. 2 credits. Limited to fourth-year veterinary students. Letter grades only. F.W. Quimby and others.

The practice of laboratory animal medicine requires a combination of preventive programs, clinical skills, knowledge of various species' biologies, familiarity with research methodology, and acquaintance with state and federal regulations. This course is offered as a two-week introduction to that specialty. Students accompany laboratory animal veterinarians on clinical rounds of Cornell's research animal housing and participate in laboratory diagnostic work. Review sessions are conducted on the biology, medicine, and husbandry of rodents, rabbits, and primates and on current legislation regulating the care and use of research animals. The course may include a field trip to the research animal facilities of Rockefeller University, the Cornell University Medical College, and the Laboratory of Experimental Medicine and Surgery in Primates.

VETPA 571 Clinical Pathology
Spring. 3 credits. Required of all second-year veterinary students. Others by permission of the instructor. Prerequisites or corequisites: VETPA 535 and VETPA 536. Letter grades only. J.T. Blue.

The lecture and laboratory course teaches the methods and interpretation of laboratory tests in the areas of hematology, clinical chemistry, urinalysis, and diagnostic cytology.

VETPA 636 Wildlife Pathology (Selective)
Fall. 2 credits. Intended for first-, second-, and third-year veterinary students. Open to others. J.M. King.

A presentation of the nature and causes of diseases of wild rabbits, opossums, squirrels, deer, certain waterfowl, and some other species. Emphasis on epizootiology, etiology, pathogenesis, diagnostic lesions, and effects on populations. Laboratory experience in specimen collection and necropsy techniques. Guest lectures are provided on ecology and population dynamics by members of the Department of Natural Resources.

VETPA 637 Postmortem Pathology (Selective)
Fall and spring. 1 credit. Intended for first-, second-, or third-year veterinary students. J.M. King.

A presentation of gross and microscopic lesions of diagnostic significance, employing color projection slides as illustrations. Emphasis on pathologic and differential diagnosis of a wide spectrum of viral, metabolic, bacterial, parasitic, and other diseases.

VETPA 638 The Bottom Line (Selective)
Fall and spring. 1 credit. Limited to veterinary students. S-U grades only. R.M. Lewis.

This course is organized in a modified Clinico-Pathologic Conference format. Selected case material derived from the Teaching Hospital patient population is discussed, emphasizing and illustrating the salient clinical, antemortem, and postmortem features of twenty-eight disease entities each semester. Interactive discussion between participating faculty and students follows each case presentation.

[VETPA 639 Autotutorial in Laboratory Animal Medicine and Science (Selective)
Spring. 1–3 credits. F.W. Quimby.

This course is offered to individuals interested in pursuing various aspects of laboratory animal medicine and science in depth. A variety of resources are available to assist students in their research on a particular topic: the library of the Division of Laboratory Animal Medicine, including the autotutorial library; the university libraries; and special information collected from other institutions. Grades are determined on the basis of a paper, an oral presentation, or the creation of an audiovisual teaching aid, any of which may be selected by the student.]

[VETPA 640 Principles of Toxicological Pathology (Selective, Graduate)
Fall, odd-numbered years. 3 credits. Intended for veterinary and graduate students. J.M. King.

The primary objective of this course is to make the student aware of the problems and their solutions encountered in pathology as it applies to the field of toxicology, with special emphasis on industrial toxicology and governmental regulations.]

VETPA 641 Clinical Immunology (Selective)
Fall. 1 credit. Limited to veterinary students. Others by permission of the instructor. R.M. Lewis.

This course emphasizes the clinical aspects of 15 specific diseases that are mediated by immunologic processes. Case material from the Teaching Hospital is used to illustrate the presenting clinical signs, laboratory diagnostic methods, clinical course, therapeutic approaches, and eventual outcome of each disease under discussion. Student participation in the informal case discussions is encouraged as a means of introducing students to the practice of veterinary medicine through case discussion and analysis. Training is also provided in the use of the college's computerized biomedical information system and the hospital records system to develop a critical case analysis, which serves as the basis for grading.

[VETPA 642 Public Policy and Laboratory Animal Science (Selective, Graduate)
Spring, even-numbered years. 2 credits. Intended for fourth-year veterinary students, residents, and veterinarians enrolled in the Graduate School who have a serious interest in pursuing a career in laboratory-animal medicine. Prerequisite: VETPA 539 or equivalent. F.W. Quimby and others.

The course is conducted as a series of small-group discussions with individual participation and weekly readings required. It focuses on public policy in laboratory animal science and includes the following discussion topics: public perceptions of animal use in teaching, research, and testing; federal and state laws governing animal use; the recognition and alleviation of pain and distress during animal experimentation; euthanasia; biologic hazards in animal research; alternatives and adjuncts to animals in research; and factors that complicate animal research.]

VETPA 643 The Use of Animal Models to Explore Physiologic and Pathologic Mechanisms in Animals and Man (Selective, Graduate)
Fall. 2 credits. Intended for fourth-year veterinary students, residents, and veterinarians enrolled in the Graduate School who have a serious interest in pursuing a career in laboratory-animal medicine. Prerequisite: VETPA 539 or equivalent. F.W. Quimby and others.

The course is conducted as a series of small-group discussions with individual participation and weekly readings required. It focuses on the use of animal models for exploring physiologic and pathogenetic mechanisms in animals and man. This segment includes the following discussion topics: the value of basic research, the benefits of animal research to human and animal health, the requisite features of an appropriate animal model, the origin of inbred and congenic strains, transgenic animals, and a survey of animal models. Animal models used in investigations of body systems (pulmonary, CNS, hematologic) are the focus during even-numbered years, while models of disease processes (oncology,

virology, autoimmunity), as well as aging and transplantation, are the focus in odd-numbered years.

VETPA 736 Pathology of Nutritional Diseases (Graduate, Selective)
Spring. 3 credits. For graduate students in pathology or nutrition and an elective course for second-, third-, or fourth-year veterinary students. Prerequisite: VETPA 535. Letter grades only. L.P. Krook.

VETPA 750 Cancer Cell Biology (Graduate)
Spring. 3 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent. J.L. Guan, R. Levine, B.U. Pauli, A. Yen.

This course focuses on the role of oncogenes, tumor suppressor genes, extracellular matrix and cell surface adhesion receptors in tumorigenesis and tumor progression. It is taught in large part from the contemporary literature. The course outline is: I. Cell Proliferation and Oncogenes, II. Regulatory Effects of Cell-Substrate and Cell-Cell Interactions, and III. Angiogenesis, Invasion and Metastasis.

VETPA 788 Seminar in Surgical Pathology (Graduate)
Fall and spring. 1 credit. Intended for residents and graduate students. Third- and fourth-year veterinary students may attend. Letter grades only. B.A. Summers (coordinator) and others.

The major objective of this discussion and seminar course is to introduce the residents to the discipline of surgical pathology. Selected material from the Surgical Pathology Service is prepared in advance for independent review by the residents. The material is presented in a slide-seminar format by the residents under the review of the faculty. Emphasis is placed on pathogenesis, etiology, and pathologic descriptions of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs.

VETPA 789 Seminar in Necropsy Pathology (Selective, Graduate, Residents)
Fall and spring. 1 credit. Letter grades only. J.M. King.

The major objective of this course is to introduce the student to the gross and microscopic features of necropsy pathology. Selected material from the Necropsy Service is prepared in advance for independent review by the students. This material is presented in a slide-seminar format by the students under the review of the faculty. Emphasis is on pathogenesis, etiology, and pathologic description of the lesions. In addition, appropriate guest lecturers cover specific areas of interest and special topics not encountered in the departmental service programs.

VETPA 793 Lectures in General Pathology (Graduate)
Fall. 2 credits. By permission of the instructor. Letter grades only. B.J. Cooper.

This course consists of only the lecture portion of Pathology 535 without the laboratory. It is designed to accommodate certain graduate students who desire exposure to general pathology but lack histology experience. The subject matter covered is described under VETPA 535.

VETPA 794 Lectures in Special Pathology (Graduate)
Spring. 3 credits. By permission of the instructor. Letter grades only. D.H. Schlafer.

This course covers only the lecture portion of Pathology 536, consisting of a systematic study of the diseases in each major organ system with emphasis on differential diagnostic features and the correlation of disturbed function with morphologic change.

[VETPA 796 Medical Primatology (Selective, Graduate, Residents)
Fall. Odd-numbered years. 1 credit. By permission of instructor. F.W. Quimby.

A survey of major diseases, medical care, and management techniques for all life stages of primates. Topics include physical examination, restraint anesthesia, housing, and management of various nonhuman primate species; bacterial, viral, and parasitic diseases; noninfectious diseases; infant and nursery care reproduction and behavioral considerations; and therapeutics.]

Pharmacology

Geoffrey W.G. Sharp, chair
D-124 Pierre A. Fish Laboratory
607-253-3650

Professors: W.S. Schwark, G.W.G. Sharp; associate professors: J.G. Babish, R.A. Cerione, C.M.S. Fewtrell, L.M. Nowak, R.E. Oswald, G.A. Weiland; assistant professors: W.A. Horne

VETPR 528 Pharmacology I (also Toxicology 528)
Fall. 4 credits. Prerequisites: VETA 500, 501, 502, 503, and 504; VETPH 525, 526, and 527; VETPA 535; or permission of the instructors. Letter grades only. G.A. Weiland and other faculty.

Topics covered include physiological disposition of drugs and poisons, drug-receptor interactions, cell and organ pharmacology, and actions of drugs affecting the nervous system. Several clinical topics are covered in the laboratory session.

VETPR 529 Pharmacology II
Spring. 2 credits. Prerequisite: VETPR 528 or permission of the instructors. Letter grades only. W.S. Schwark and other faculty.

Topics covered include chemotherapy and the action of drugs affecting the heart, gastrointestinal tract, skin, and the respiratory, endocrine, and urinary systems.

VETPR 607 Introduction to Pharmacology
Fall. 1 credit. By permission of the instructors. Letter grades only. G.A. Weiland and other faculty.

An introduction to basic pharmacological principles for nonveterinarians. Topics covered include physiological disposition of drugs and poisons and drug-receptor interactions.

VETPR 608 Basic Pharmacology
Fall. 3 credits. Prerequisite: Permission of the instructors. Letter grades only. G.A. Weiland and other faculty.

Basic pharmacology for nonveterinarians. Topics as for Pharmacology I (VETPR 528) but excluding the laboratory session.

VETPR 610 Introduction to Chemical and Environmental Toxicology (also Toxicology 610 and Food Science 610) (Undergraduate, Graduate, Selective)
Fall. 3 credits. J.G. Babish.

This course is designed to introduce graduate and upperclass undergraduate students to the principles of toxicology. Specifically the course covers the concepts underlying the absorption, distribution, and excretion of toxicants; biological systems as targets of toxic agents; commonly encountered toxic agents; and the ecological distribution of toxic materials.

VETPR 619 Clinical Pharmacology (Selective)
Fall. 1 credit. Limited to third- and fourth-year veterinary students. Others by permission of the instructor. S-U grades only. W.S. Schwark.

An extension of the core veterinary pharmacology courses, VETPR 528 and 529. Emphasis will be on selected topics in veterinary therapeutics with reference to clinical case material.

VETPR 620 Advanced Clinical Pharmacology
Spring. 1 credit. Limited to third- and fourth-year veterinary students. Others by permission of the instructor. S-U grades only. W.S. Schwark.

An extension of VETPR 619.

VETPR 621 Toxicology (also Toxicology 621)
Spring. 1 credit. Nonveterinary students by permission of the instructor. S-U grades only. W.S. Schwark.

Basic and clinical aspects of the more common poisonings that affect domestic animals are considered. Emphasis is on heavy-metal poisoning; chelation phenomena; selected organic poisonings, including pesticides, herbicides, and rodenticides; and forensic considerations.

VETPR 622 Special Projects in Pharmacology
Fall, spring, and summer. 1–3 credits. By permission of the instructor. Pharmacology faculty.

VETPR 629 Research Opportunities in Veterinary Medicine
Fall, spring, summer, or January. 1–4 credits. By permission of the instructor. S-U grades only. Pharmacology faculty.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

VETPR 660 Safety Evaluations in Public Health (also Toxicology 660)
Spring. 2 credits. Limited to second-, third-, and fourth-year veterinary students and graduate students. Others by permission of the instructor. Prerequisites: an introductory or intermediate course in biology, biochemistry, or physiology. A concurrent or prior course in toxicology would be helpful. J.G. Babish.

Applying toxicologic methods for assessing chemical hazards to populations has become a major role of toxicologists in industry and government today. In this course, current methodologies in risk assessment will be presented with emphasis on the interpretation of data in terms of public health effects. Topic covered include: (1) the concept of a safe level, (2) standards for acceptable testing, (3) good laboratory practices and government regulations (4) testing procedures used in safety evaluation, and (5) monitoring human populations. Students will be evaluated on their ability to interpret data from animal studies and to estimate risks of human exposure.

VETPR 700 Calcium as a Second Messenger in Cell Activation
Spring, odd-numbered years. 2 credits. By permission of the instructor. Lecture-discussion. C.M.S. Fewtrell.

Regulation of intracellular calcium and techniques for studying calcium movements and distribution in cells. Calcium channels and exchangers, calcium-binding proteins, and calcium stores. Phosphatidylinositol turnover, release of calcium from intracellular stores, and activation of calcium influx. Calcium gradients and oscillations. Other signal transduction pathways and second messengers involved in cell activation. Each topic will be introduced with a lecture that will be followed by discussion of recent papers from the literature.

VETPR 703 Receptor Binding: Theory and Techniques (also Biological Sciences 790-02)
Spring, even-numbered years. 2 credits. By permission of the instructors. R.E. Oswald and G.A. Weiland (coordinator).

The course covers both the practical and theoretical tools needed to set up and use a radioligand binding assay to measure and characterize physiologically and pharmacologically relevant neurotransmitter hormone drug receptors. The emphasis of the course is on the quantitative and physical chemical aspects of receptor binding. Topics discussed are historical background of receptor theory; basic methods of a radioligand binding assay, including various methods of separating and measuring bound and free ligand; methods of analyzing equilibrium binding, the thermodynamic basis of the binding; equilibrium binding for complex binding mechanisms, including allosteric mechanisms; coupling of binding to response; antagonism of response and inhibition of binding; kinetics of simple and complex binding mechanisms; and common artifacts encountered in radioligand binding assays.

[VETPR 704 CNS Neuropharmacology: Mechanisms of Synaptic Transmission
Fall, even-numbered years, first offered fall 1994. 2 credits. Limited to 20 graduate students and undergraduate seniors, by permission of the instructor. L.M. Nowak.

This survey course in vertebrate central nervous system physiology and pharmacology focuses on mechanisms of neurotransmitter action at the membrane and cellular levels. Roles of selected neurotransmitters in normal and dysfunctional brains are covered. Topics are introduced in lectures and followed up in discussions of recent journal articles.]

VETPR 705 Molecular Mechanisms of Receptor-G Protein Coupled Signaling
Spring, even-numbered years. 2 credits. By permission of the instructor. R.A. Cerione.

This course focuses on the mechanisms of action of GTP binding proteins. A number of receptor-coupled signaling systems are examined, including adenylate cyclase, vertebrate vision, phosphatidylinositol lipid turnover, and receptor systems regulating various ion channels.

Special Projects and Research in Pharmacology
Fall, spring, and summer. 1–3 credits each topic. By arrangement with the instructor. Pharmacology faculty.

Independent study or research.

VETPR 711 The Role of Calcium in Stimulus-Secretion Coupling
C.M.S. Fewtrell.

VETPR 712 Eosinophil Stimulus-Secretion Coupling
C.M.S. Fewtrell.

VETPR 713 Mechanisms of Growth-Factor Action
R. A. Cerione.

[VETPR 714 Central Nervous System Neurotransmitters
L.M. Nowak. Not offered 1992–93.]

VETPR 716 Neurobiology of Seizure Disorders
W.S. Schwark.

VETPR 717 Single-Channel Recording
R.E. Oswald.

VETPR 718 Structure-Function of the Nicotinic Acetylcholine Receptor
R.E. Oswald.

VETPR 720 Modulation of Nicotinic Acetylcholine Receptor Function
G.A. Weiland.

VETPR 721 Molecular Mechanisms of Pharmacological Blockade of Voltage-dependent Calcium Channels
G.A. Weiland.

VETPR 723 The Role of Calcium in the Control of Electrolyte Transport
G.W.G. Sharp.

VETPR 724 The Control of Hormone Secretion
G.W.G. Sharp.

VETPR 730 Graduate Research in Pharmacology
1–10 credits.

This course is offered by individual faculty members in the Department of Pharmacology for graduate students undertaking research toward M.S. or Ph.D. degrees.

Special Topics in Pharmacology
Fall, spring, and summer. 1–3 credits each topic. By arrangement with the instructor. Pharmacology faculty.

Reading and discussions.

VETPR 741 Neuromodulation G.A. Weiland.

VETPR 742 Receptor Mechanisms G.A. Weiland.

VETPR 745 Biochemical Neuropharmacology G.A. Weiland.

VETPR 747 Amino Acid Neurotransmitters L.M. Nowak.

VETPR 748 Stimulus-Secretion Coupling C.M.S. Fewtrell.

VETPR 749 Second Messengers in Cell Activation C.M.S. Fewtrell.

VETPR 750 Cell Calcium C.M.S. Fewtrell.

VETPR 754 G Proteins in Signal Transduction R. A. Cerione.

VETPR 755 Calcium in the Control of Hormone Secretion G.W.G. Sharp.

VETPR 756 Mechanisms of Calcium Handling G.W.G. Sharp.

VETPR 757 Intestinal Electrolyte Transport G.W.G. Sharp.

VETPR 759 Receptor Binding Techniques R.E. Oswald and G.A. Weiland (coordinator).

VETPR 760 Advanced Topics in Pharmacology Pharmacology faculty.

Physiology

David Robertshaw, chair
727 Veterinary Research Tower
607-253-3854

Professors: K.W. Beyenbach, A. Dobson, K.A. Houpt, T.R. Houpt, P.W. Nathanielsz, D. Robertshaw, D.N. Tapper, R.H. Wasserman, J.F. Wootton; associate professors: R.A. Corradino, J.E. Fortune, R.F. Gilmour, E.R. Loew, A. Quaroni, R.B. Silver; senior lecturer: C.H. McFadden; lecturer: R. Rawson

Instruction in physiology in the core veterinary curriculum is concentrated in the first year and includes two semesters devoted to systems and cellular physiology. Laboratories, demonstrations, and small-group discussions exemplifying physiological principles in various animal species are an integral part of these offerings. The courses are directed toward an understanding of the function, integration, and control, as well as the cellular and biochemical basis, of physiological processes. The laboratory, demonstrations, and small-group discussions are considered a significant aspect of the educational process, providing the students with hands-on experience and enabling them to observe and work with concepts and mechanisms associated with important physiological events.

Faculty are also members of the Section of Physiology, Division of Biological Sciences. The section has teaching responsibilities in the undergraduate curriculum, offering basic courses in introductory biology, introductory animal physiology, cellular physiology, and mammalian physiology, in addition to upper-level specialized courses. Faculty are also members of the graduate Field of Physiology, the graduate Field of Veterinary Medicine, and other graduate fields.

The facilities of the department and section include laboratories and offices in the Veterinary Research Tower, D-wing of Schurman Hall, Morrison Hall, and the Stimson Hall Physiology Annex. Research projects range from those dealing with the physiology and metabolism of the whole animal to the investigation of the hormonal regulation of gene expression. The laboratories and animal

quarters are well equipped. The following research areas are emphasized: (a) reproductive physiology, (b) endocrinology, (c) cellular physiology, (d) neurophysiology, (e) gastrointestinal physiology, (f) metabolism, (g) behavioral physiology, (h) renal physiology, (i) vision, (j) cardiovascular physiology, and (k) temperature regulation.

Bio S 214 Biological Basis of Sex Differences (Undergraduate)
Fall, alternate years. 3 credits. Prerequisite: one year of introductory biology. Occasional discussions to be arranged. J.E. Fortune.

The structural and functional differences between the sexes are examined. Emphasis is placed on mechanisms of mammalian reproduction; where possible, special attention is given to studies of humans. Current evidence of the effects of gender on nonreproductive aspects of life (behavior, mental and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and a basis for objective evaluation of sex differences in relation to contemporary life.

Bio S 313 Histology: The Biology of the Tissues (Undergraduate)
Fall. 4 credits. Prerequisite: one year of introductory biology; a background in vertebrate anatomy and organic chemistry or biochemistry strongly recommended. R.B. Silver.

Provides the student with a basis for understanding the microscopic, fine structural, and functional organization of vertebrates, as well as the methods of analytic morphology at the cell and tissue levels. The dynamic interrelations of structure, composition, and function in cells and tissues are emphasized. (Course may include work with invertebrate and/or vertebrate animals.)

Bio S 316 Cellular Physiology (Undergraduate)
Spring. 4 credits. Limited to 100 students, with preference given to students concentrating in animal physiology and anatomy. Each lab limited to 24 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 330 or 331. A. Quaroni and staff.

Lectures introduce students to the most current information on the ways cells function and regulate themselves and neighboring cells and on what molecules are involved in those regulatory processes. Laboratories provide an introduction to cell and organ culture and to immunological techniques used to study cell structure and function in vivo and in vitro. Experiments performed in the laboratory are closely related to subjects covered in the lecture and provide practical experience with them.

VETPH 346 Introductory Animal Physiology (also Biological Sciences 311) (Undergraduate)
Fall. 3 credits. Prerequisites: one year each of college-level biology, chemistry, and mathematics. E.R. Loew.

A general course in animal physiology emphasizing principles of operation, regulation, and integration common to a broad range of living systems from the cellular to the organismal level. Structure-function relationships are stressed along with underlying physical-chemical mechanisms.

VETPH 348 Animal Physiology Experimentation (also Biological Sciences 319) (Undergraduate, Graduate)
Fall. 3 credits. Enrollment limited to 80 students. Designed for upper-level undergraduate and graduate students majoring in physiology, and others interested in biomedically related professions. Each laboratory section limited to 20 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 311 or permission of instructor based on previous meritorious performance in another introductory animal physiology course. R.A. Corradino (coordinator) and P.W. Concannon.

A series of student-conducted in vitro and in vivo experimental exercises designed to illustrate basic physiological processes in animals and to introduce students to animal physiology research techniques, instrumentation, experimental design, and interpretation of results. Protocols include anesthesia, dissection, vivisection, physiographic recording, and computer simulations. Experiments with living tissues and live animals will examine properties of blood, muscle, nerves, cardiovascular, respiratory, and gastrointestinal function and control, and endocrine regulation of mineral metabolism and reproductive tissue activity. Experimental resources include live animals of several vertebrate species, including frogs, birds, rats, and rabbits, which will be euthanized in conjunction with the laboratory exercises. Grading is based on required written reports of laboratory activities.

Bio S 458 Mammalian Physiology (Undergraduate)
Spring. 6 credits. Enrollment limited. Graduate student auditors allowed. Prerequisite: Biological Sciences 311 (VETPH 346) or equivalent with permission of instructor. K.W. Beyenbach and staff.

Selected topics in mammalian physiology are discussed in the lecture and concurrently studied in the laboratory. Topics are selected from the following: physiology of excitable and epithelial cell membranes, the autonomic nervous system, cardiovascular physiology, gastrointestinal physiology, renal physiology, energy metabolism and acid-base balance. Live animals and isolated living tissues are studied in the laboratory portion of the course.

Bio S 499 Undergraduate Research in Biology (Undergraduate)
Fall and spring. Variable credit. Prerequisite: written permission from the staff member who will supervise the work and assign the grade. Any faculty member in the Division of Biological Sciences may act as a supervisor. Faculty supervisors outside the division are acceptable only if a faculty member of the division agrees to take full responsibility for the quality of the work. *This course is divided into multiple sections as printed in the* Course and Time Roster *and its supplement.* Students must register under supervisor's assigned section number or under section 1 if supervisor was not assigned a section number. Staff.

Practice in planning, conducting, and reporting independent laboratory and library research programs. Research credits may not be used in completion of the following concentration areas: animal physiology and anatomy; biochemistry; botany; cell biology; and ecology, systematics, and evolution. No more than 4 credits of research may be used in completion of the following concentration areas: genetics and development, neurobiology and behavior.

VETPH 526 and 527 Systems Physiology I and II
Fall, 6 credits; Spring, 5 credits. Required for all first-year veterinary students. Others with permission of the course coordinator.

This is a two-semester animal physiology course which includes systemic and cellular aspects of the physiology of the common domestic species. Whole animal physiology is approached from the perspective of clinical veterinary medicine. All of the major systems are considered. Individual and cooperative learning in small groups is emphasized. Case-based exercises, along with lectures, laboratory exercises, computer simulations, and group discussions are an integral part of the course.

VETPH 528 Veterinary Ethics
Fall and spring. 1 credit. Limited to veterinary students. D. Robertshaw.

A lecture-and-discussion course dedicated to exploring some of the ethical issues that face the veterinarian in modern society as well as within the profession.

VETPH 612 Research Opportunities in Veterinary Medicine (Selective)
Fall, spring, summer, and January. 1-4 credits. Limited to veterinary students. By permission of the instructor. Physiology faculty.

An independent-study course. Students work closely with individual faculty members in their research laboratories.

Bio S 619 Lipids (also Nutritional Sciences 602) (Graduate)
Fall. 2 credits. A. Bensadoun.

An advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is placed on critical analysis of current topics in lipid methodology; lipid absorption; lipoprotein secretion, molecular structure, and catabolism; mechanism of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

VETPH 625 Problems in Dog and Cat Behavior (Selective)
Spring. 1 credit. Students of other colleges by permission of the instructor. K.A. Houpt.

The goal of this course is to give veterinary students the ability to treat the behavior problems of cats and dogs. The most common problems are aggression and destructiveness in dogs and aggression and house soiling in cats. Other, less frequently encountered problems are insufficient or excessive sexual or maternal behavior, wool chewing, and hypervocalization in cats, and hyperactivity, phobias, and barking in dogs. History-taking, counseling, and follow-up methods will be presented. Each student will have the opportunity to participate in three cases. Cases will be treated in the clinic, during house calls, and via telephone consultations. The behavioral and pharmacological techniques used to treat behavior problems will be presented and the success of each evaluated.

VETPH 626 Problems in Equine Behavior (Selective)
Spring. 1 credit. Students of other colleges by permission of the instructor. K.A. Houpt.

The goal of this course is to give veterinary students the ability to treat behavior problems of horses. The most common behavior problems are aggression, self-mutilation, stable vices, and foal rejection. History-taking, counseling, diagnostic tests, follow-up, and the importance of cooperation with the referring veterinarian will be presented. Methods of preventing behavior problems, training techniques of value to the practitioner, and socialization of foals will be presented using videotapes and demonstrations. The behavioral and pharmacological techniques used to treat behavior problems will be presented and the success of each evaluated. The students will be encouraged to develop techniques of their own based on an understanding of normal equine behavior.

VETPH 627 Acid-Base Relations (also Biological Sciences 715) (Selective)
Fall, spring, and summer. 2 credits. Students of other colleges by permission of the instructor. Prerequisite: VETPH 526 or permission of the instructor. A. Dobson.

The course uses a self-instruction program to promote an understanding of the basis, interpretation, and technique of measuring acid-base status. The text, *Acid-Base Physiology* by R. W. Winters, K. Engel, and R. B. Dell, starts with the elementary physical chemistry of acids, bases, and buffers and then discusses the bicarbonate buffer system and whole-blood buffers. The physiological controls for acid base of the respiratory and renal system are introduced, followed by a logical development of acid-base terminology. The latter part of the text systematically describes the physiopathology and etiology of the four primary acid-base disturbances. This book is particularly effective in consolidating the basic principle because it reinforces the concepts it introduces throughout the remainder of the text. It requires about thirty hours of study.

VETPH 628 Graduate Research in Animal Physiology (also Biological Sciences 719) (Graduate)
Fall and spring. Variable credit. Prerequisite: written permission of section chairperson and staff member who will supervise the work and assign the grade. S-U grades optional.

Similar to Biological Sciences 499 but intended for graduate students who are working with faculty members on an individual basis.

Bio S 710-718 Special Topics in Physiology (Graduate)
Fall or spring. 1 or 2 credits for each topic. May be repeated for credit. Enrollment in each topic may be limited. S-U grades optional, with permission of instructor.

Lectures, laboratories, discussions, and seminars on specialized topics.

Fall 1992: Four topics are offered.

Bio S 711 Stress Physiology
Fall. Prerequisite: Bio S 311 or equivalent.

Stress physiology discussed as part of animal welfare. The emphasis will be on physiological and behavioral assessment of stress in domestic and laboratory animals. Seminar format.

Bio S 713 Cardiac Electrophysiology
Fall, even-numbered years. 1 credit. S-U grades optional. R.F. Gilmour.

Survey of cardiac action potentials, passive membrane properties, ion channels, and cardiac arrhythmias. Emphasis on nonlinear dynamical aspects of cardiac electrophysiology and cardia arrhythmias.

Bio S 715 Acid-Base Relations (also VETMI 627) (Graduate)
Fall and spring. 2 credits. A. Dobson.

An independent study course.

Bio S 717 Structure and Function of Joints with Emphasis on Arthritis
Fall, even-numbered years. Undergraduate and graduate students.

One-hour lecture each week to be arranged.

Spring 1993: Three topics are offered.

Bio S 714 Physiology of Pregnancy
Spring, odd-numbered years.

Seminar course covering aspects of maternal, placental, and fetal function. Emphasis on fetal growth, respiration, neural and endocrine and cardiovascular function, myometrial activity, parturition, and placental function.

Bio S 715 Acid-Base Relations (also VETMI 627) (Graduate)
Fall and spring. 2 credits. A. Dobson.

An independent study course.

Bio S 716 Regulation of Mitosis and the Cell Cycle
Spring, odd-numbered years. 1 credit. R.B. Silver.

This course will focus on regulatory mechanisms, Ca2+ regulation, metabolic pathways that exhibit cell cycle–related periodicities, genetic biochemical and cell physiological studies of the cell cycle, and evidence for intracellular clocks and escapements.

VETPH 720 Special Problems in Physiology (Graduate)
Fall and spring. Registration by permission. Laboratory work, conferences, collateral readings, and reports. Adapted to the needs of students.

VETPH 726 Physiology I
Fall. 3 credits. Limited to graduate students. Prerequisites: a course in cell physiology or biochemistry and a course in anatomy. By permission of the instructor. Letter grades only.

This course consists of the lectures only of VETPH 526. The subjects include the nervous system, muscle, blood, and cardiovascular, respiratory, and renal physiology.

VETPH 727 Physiology II (Graduate)
Spring. 3 credits. By permission of the instructor. Prerequisite: VETPH 726. Letter grades only. T.R. Houpt and others.

A continuation of organ and systems physiology of domestic animals that includes acid-base relations and environmental physiology, simple-stomach and ruminant digestive systems, hepatic function, liver and metabolic physiology, endocrinology, and reproduction, with emphasis on medically relevant aspects. Lectures only.

[VETPH 752 Biological Membranes and Nutrient Transfer (also Biological Sciences 618) (Graduate)
Spring, alternate years. 2 credits. Prerequisites: courses in animal or plant physiology, quantitative and organic chemistry and physics, and permission of the instructor. Recommended: a course in cellular physiology. Letter grades only. R.H. Wasserman.

An introduction to elementary biophysical properties of biological membranes, theoretical aspects of permeability and transport, mechanism of transfer of inorganic and organic substances primarily across epithelial membranes, and characteristics and properties of transporting macromolecules and ion channels.]

[VETPH 758 Molecular Mechanisms of Hormone Action (also Biological Sciences 658) (Graduate)
Spring, even-numbered years. 2 credits. Minimum enrollment, 6 students. Prerequisite: permission of instructor. R.A. Corradino.

An advanced course developed from the current literature on endocrine mechanisms.]

[VETPH 759 Nutrition and Physiology of Mineral Elements (also Biological Sciences 615 and 659) (Graduate)
Spring, even-numbered years. 3 credits. Prerequisites: courses in basic physiology, intermediate biochemistry, and general nutrition. R. Schwartz (coordinator), D.R. VanCampen, R.H. Wasserman.

Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macroelements and microelements, with emphasis on recent developments. Information is included on methodologies of mineral research and the essentiality, requirements, transport, function, homeostasis, interrelationships, and toxicity of various mineral elements.]

Fundamentals of Endocrinology, Lecture (Animal Sciences 427) (Graduate)
Fall. 3 credits. Prerequisite: human or veterinary physiology or permission of the instructor. W.R. Butler.

The physiology of the endocrine glands and the roles played by each hormone in the regulation of normal body processes is discussed. Endocrine regulation of growth, metabolism, and reproduction is emphasized. Examples are selected from domestic species and humans.

Fundamentals of Endocrinology, Laboratory (Animal Sciences 428) (Graduate)
Fall. 2 credits. Each lab limited to 30 students. Prerequisite: concurrent registration in Animal Sciences 427 or permission of the instructor. W.R. Butler.

Laboratory exercises are designed to demonstrate hormonal mechanisms for each of the major endocrine glands. Laboratory techniques include animal surgery, blood collection, and hormone radioimmunoassay.

Bio S 811 and 812 Advanced Physiological Methods I and II (Graduate)
Fall and spring. 2 credits each. Enrollment limited. Prerequisites: graduate student status or permission of course coordinator. S-U grades only. Faculty of physiology.

This is a course primarily for graduate students in physiology and related disciplines. Experiments are carried out in the laboratories of physiology faculty members to acquaint graduate students with the latest techniques/methods in physiological research. Three modules are offered each semester by arrangement with the course coordinator.

Photography

David Grunfeld: 1, 24
Dede Hatch: 27
Chris Hildreth: cover, 4, 34
Peter Morenus: 41

College of Veterinary Medicine
Cornell University

Please send:

- ☐ Information on the summer high school program Explorations in Veterinary Medicine
- ☐ Information on the Minority High School Student Research Apprenticeship Program
- ☐ Admissions brochure (D.V.M.)
- ☐ Application for admission (D.V.M.)
- ☐ Guaranteed admission program (D.V.M.)
- ☐ Notice of the annual Open House
- ☐ Additional copies of this catalog
- ☐ Catalog of the Graduate School

Please specify areas of interest: _____

_____

_____

_____

Name _____

Address _____

City _____

State _____ Zip _____

Cornell University
USPS 132-860
College of Veterinary Medicine
C-106 Schurman Hall
Ithaca, New York 14853-6401

Second-Class