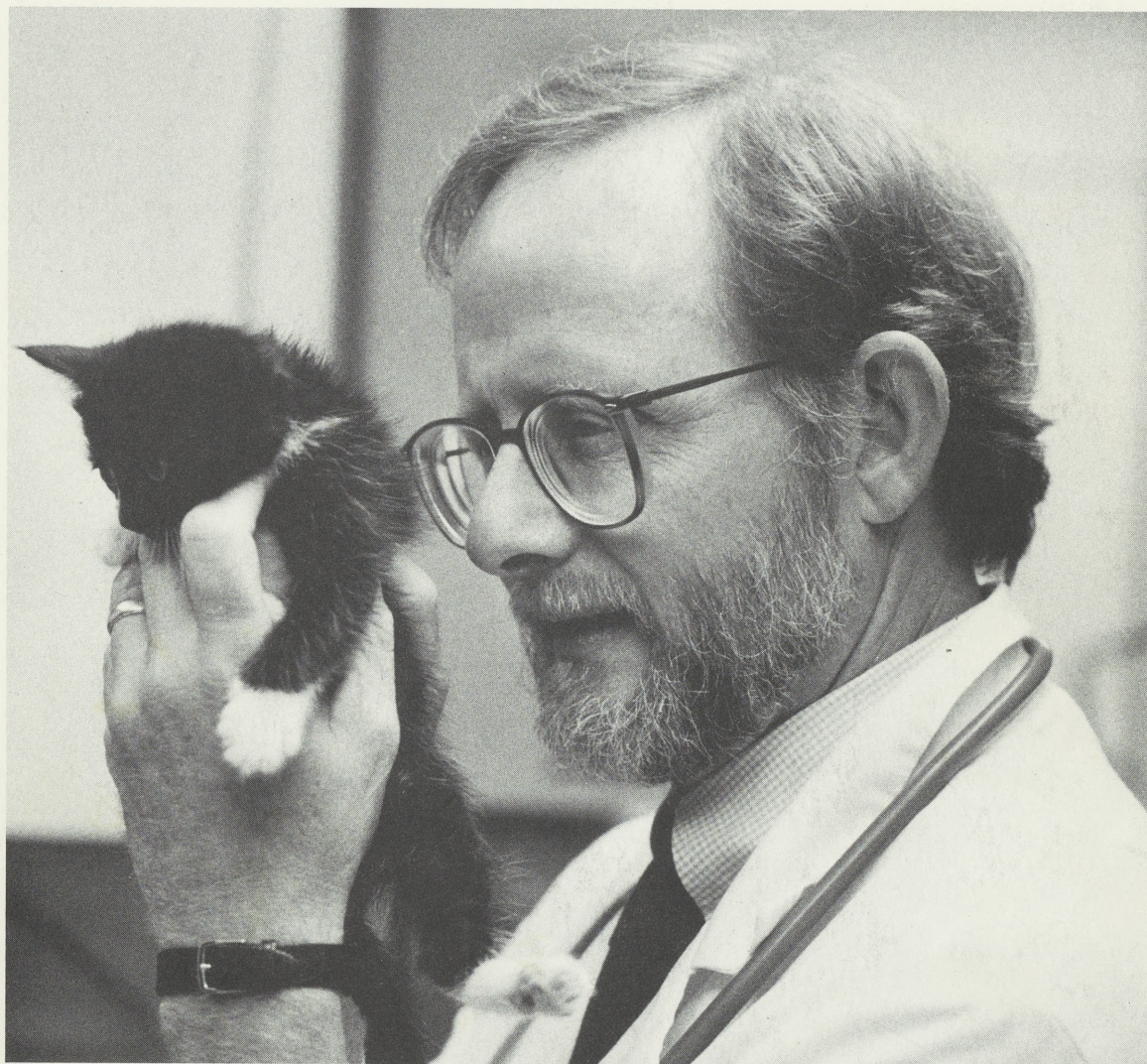


CORNELL

U N I V E R S I T Y



College of Veterinary Medicine

Announcement Catalog
1991-1992

Cover: A pediatric patient is examined at the Veterinary Medical Teaching Hospital's Small Animal Clinic where more than 12,000 small companion animals receive medical or surgical care each year.

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

**Cornell University
(USPS 132-860)**

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College of Veterinary Medicine

Cornell University 1991-1992



Cornell Academic Calendar

Fall Semester	1991-92	1992-93
Registration	August 27, 28	August 25, 26
Instruction begins	August 29	August 27
Fall recess	October 12-15	October 10-13
Thanksgiving recess	Nov. 27-Dec. 1	November 25-29
Last day of classes	December 6	December 4
Study period	December 7-11	December 5-9
Examination period	December 12-20	December 10-18

Spring Semester

Registration	January 16, 17	January 21, 22
Instruction begins	January 20	January 25
Spring recess	March 14-22	March 20-28
Last day of classes	May 1	May 7
Study period	May 2-6	May 8-12
Examination period	May 7-15	May 13-21
Commencement	Sunday, May 24	Sunday, May 30

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.

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any legally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, sexual orientation, age, or handicap. The university is committed to the maintenance of affirmative action programs that will assure the continuation of such equality of opportunity. Sexual harassment is an act of discrimination and, as such, will not be tolerated. Inquiries concerning the application of Title IX may be referred to Cornell's Title IX coordinator (coordinator of women's services) at the Office of Equal Opportunity, Cornell University, 234 Day Hall, Ithaca, New York 14853-2801 (telephone: 607 255-3976).

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.



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Surrounded by the natural beauty of upstate New York, the main campus of the College of Veterinary Medicine at Cornell University occupies about twenty acres. Seen here is the college's Veterinary Research Tower.

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 presently being

constructed that will add a Primary Learning Center, a new Veterinary Medical Teaching Hospital, and greatly expanded office and research space.

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 Connecticut, Delaware, Maine and New Jersey, and with Puerto Rico for a selected 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.

Hands-on experience begins early in a D.V.M. student's education. Emphasis is placed on the practical applications of their basic knowledge to the diagnosis, prevention, and treatment of disease.

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 material means that successful applicants must have demonstrated achievement and potential for comprehension of scientific materials 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 balance of courses taken, the difficulty of courses selected, and the ability to carry a heavy academic course load at a demanding 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 in Matters Relating to Animals and the Veterinary Profession:

Veterinary medicine is an animal-oriented profession. Therefore, 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:

<i>Semester</i>	<i>Minimum Semester Credits</i>	<i>Minimum Quarter Credits</i>
English composition*	6	9
Biology or zoology (with laboratory)	6	9
Inorganic chemistry (with laboratory)	6	9
Organic chemistry (with laboratory)	6	9
Biochemistry	4	6
Physics (with laboratory)	6	9
General microbiology (with laboratory)	3	4.5

*Half of this requirement may be satisfied with an oral communication course.

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. For example, three outstanding credits of physics could be allowed, but not all six. 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.

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.

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 in August of the year preceding possible matriculation. 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 admission 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, 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.

It is imperative that the admissions committee has detailed and translated summaries of veterinary medical academic programs and accomplishments for those seeking advanced placement from schools in foreign countries.

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

University Requirements

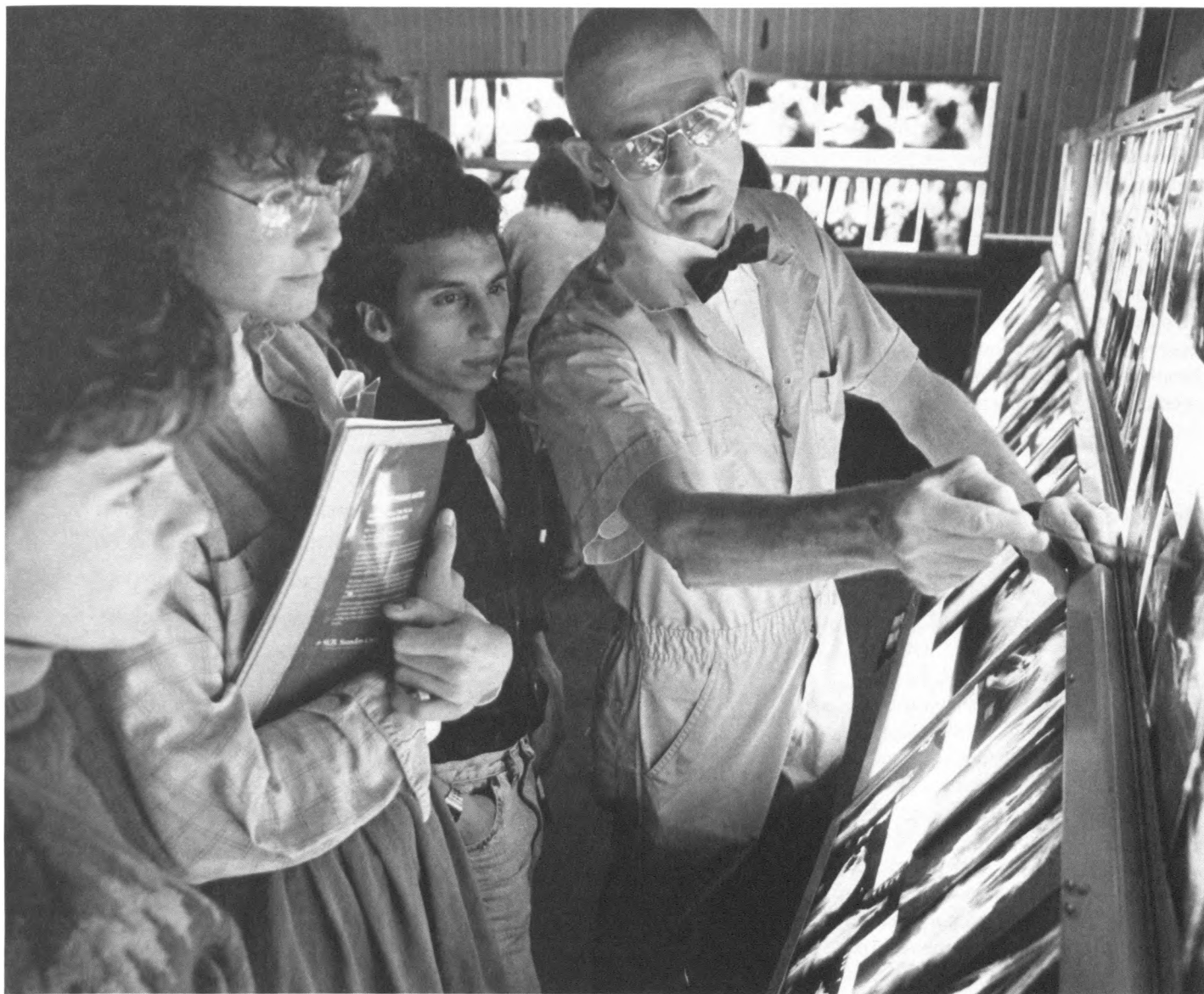
Applicants accepted for admission are required to pay a registration fee and will be notified of the amount and the due date at the time of acceptance. No refunds will be made to applicants who withdraw after the due date of the fee.

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.



In Applied Anatomy students study radiographs to review the anatomical knowledge essential to various medical and surgical procedures.

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 Food Animal Surgical Techniques
Llamas and Alpacas
Dentistry (small animal)
Goats: Management and Diseases
Diseases of Aquarium Fish
Medical Primatology
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
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.

Summary of D.V.M. Curriculum

First Year

<i>Fall Term</i>				<i>Credits</i>	<i>Spring Term</i>				<i>Credits</i>	
VETA	500	Gross Anatomy: Small Animal	4	VETA	501	Gross Anatomy: Large Animal	5			
VETA	502	Microscopic Anatomy*	—	VETA	502	Microscopic Anatomy (continued)	3.5			
VETA	504	Neuroanatomy and Clinical Neurology*	—	VETA	504	Neuroanatomy and Clinical Neurology (continued)	2.5			
VETA	507	Animal Development	3	VETA	508	Anatomy of the Fish and Bird	0.5			
VETPH	526	Systems Physiology I	6	VETMI	515	Veterinary Immunology	2			
VETPH	528	Veterinary Ethics*	—	VETPH	527	Systems Physiology II	5			
VETCS	568	Foundations of Clinical Science I	2	VETPH	528	Veterinary Ethics	1			
VETCS	581	Animal Nutrition	2	VETCS	569	Foundations of Clinical Science II	2			
			17				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

<i>Fall Term</i>			<i>Credits</i>	<i>Spring Term</i>			<i>Credits</i>
VETMI	510	Veterinary Parasitology	4	VETMI	518	Infectious Diseases III	2
VETMI	516	Infectious Diseases I	4	VETPR	529	Pharmacology II	2
VETMI	517	Infectious Diseases II	2	VETPA	536	Veterinary Pathology II	4.5
VETPR	528	Pharmacology I	4	VETCS	561	Theriogenology I	3
VETPA	535	Veterinary Pathology I	4	VETPA	571	Clinical Pathology	3
VETCS	545	Epidemiology	2	VETCS	579	General Medicine and Surgery	4
			<hr/>				<hr/>
			20				18.5
Selectives (to be taken either fall or spring)							4

Third Year

<i>Fall Term</i>			<i>Credits</i>	<i>Spring Term</i>			<i>Credits</i>
VETA	505	Applied Anatomy	1	VETA	506	Applied Anatomy	1
VETCS	548	Anesthesiology	1	VETCS	520	Preventive Medicine in	
VETAV	555	Avian Diseases	2			Animal Health Management	1
VETCS	562	Theriogenology II	3	VETCS	531	Regulatory Medicine	Req.*
VETCS	563	Large Animal Medicine and		VETPA	539	Laboratory Animal Medicine	1
		Surgery	5	VETCS	564	Large Animal Medicine and	
VETCS	566	Radiographic Techniques	1			Surgery	6
VETCS	567	Clinical Nutrition	2	VETCS	582	Large Animal Surgical Exercises	2
VETCS	583	Small Animal Medicine and		VETCS	584	Small Animal Medicine and	
		Surgery	5			Surgery	7
			<hr/>	VETCS	586	Small Animal Surgical Exercises	<hr/>
			20				20

*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

<i>Required</i>	<i>Credits</i>	<i>Required</i>	<i>Credits</i>
VETPA 540 Pathology Service	2	VETCS 594 Large Animal Medicine Service	2
VETCS 572 Senior Seminar	1	VETCS 598 Dermatology Service	2
VETCS 574 Large Animal Surgery Service	4		<hr/> 29*
VETCS 575 Ambulatory Service	4	<i>Selectives</i>	
VETCS 578 Clinical Anesthesia	2	VETCS 547 Practice Management	2
VETCS 580 Radiology Service	2	VETPA 549 Laboratory Animal Medicine	2
VETCS 589 Small Animal Medicine		VETCS 570 Theriogenology Service	2-4
Service	4	VETCS 596 Opportunities in Veterinary	
VETCS 591 Small Animal Surgery Service	4	Medicine	2-4
VETCS 593 Ophthalmology Service	2		

*A total 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 selectives courses listed.



**A student enjoys time
with her companion.**

D.V. M. Students

Class of 1992

Adler, Amy J.
Amaro, Maria
Angelos, John A.
Ball, Michael A.
Barcala, Roberto P.
Berian, Claire A.
Bogart, Silke

Bregman, Susan L.
Bukowski, Michael P.
Bull, Jennifer K.
Chary, Dorothy N.
Cilli, Janet M.
Colon, Elia
Conner, Deborah L.
Cook, Gabriel D.

Couret, Karmen I.
Culbert, Laura
Darrigrand, Ruth A.
Davis, Valerie L.
Delaney, Mari A.
De Muynck, Gary M.
Denver, Mary C.
Deyhim, Carol J.

Di Stephan, Janine M.
 Evans, Eric R.
 Fernandez, Miguelina
 Galvis, Pilar
 Glick, Lauren S.
 Gold, Richard C.
 Graham, Mary E.
 Greenberger, Leah J.
 Hazel, Alison M.
 Heinzerling, Heidi M.
 Hillman, Jeanne M.
 Hunter-Tillman, Linda S.
 Kantrowitz, Lawrence B.
 Kearing, Jocelyn
 Kelly, Michael P.
 Kleps, Nora A.
 Klohn, Andreas
 Kornreich, Bruce G.
 Leverenz, Nancy E.
 Licari, Louis G.
 McKenna, Antigone M.
 Malloy, Kelly
 Marsico, Lisa A.
 Monachelli, Margaret T.
 Morrissey, James K.
 Mostoller, Margaret
 Muffoletto, Bonnie L.
 Nezezon, Joel M.
 Nowak, Mark S.
 Peck, Penny M.
 Pini, Maria T.
 Polehinke, Thomas A.
 Posner, Lysa P.
 Purcell, Karen A.
 Radlinsky, Maryann G.
 Ramos, Lillian
 Reid, Richard
 Rodgers, Robinson R.
 Saunders, Katherine
 Schottman, Kate
 Silbiger, Mark H.
 Spaulding, Barry W.

Stummer, Margaret R.
 Sullivan, Thomas C.
 Surman, Vivien
 Tapley, Kathleen
 Trachtenberg, David K.
 Triana, Maria S.
 Vannerson, Lesley A.
 Vrba, Janine
 Waldow, Dorraine
 Weston, Hayley S.
 Willmann, Reinemarie T.
 Wilson, Christine S.
 Wohl, Deborah D.
 Yagoda, Chahna

Class of 1993

Altschul, Martina
 Bartlett, Steven M.
 Bergendorff, Kim L.
 Berger, Allan L.
 Beyer, Michael J.
 Boehringer, Michelle M.
 Brush, Michelle
 Bryant, Nelva J.
 Butler, Emily C.
 Cella, Janine M.
 Childers, Pamela
 Cobb, Matthew A.
 Collier, Karyn L.
 Côté, Etienne
 Cronin, Carin
 DeLorenzo, Kenneth J.
 Diggle, Edmund A., III
 Eirmann, Laura A.
 Famigletti, Nancy E.
 Fleckenstein, Polly A.
 Fornes, Mary Lee
 Fournier, Jeanne C.
 Freedman, William K.
 Gantt, Kenneth R.
 Gosson, Gloria

Greenberg, Kim
 Gurshman, Rebecca J.
 Heller, Ruth L.
 Herzog, Maria I.
 Hoffman, Dwight J.
 Hornig, Linda S.
 Howlett, Brian A.
 Jamrosz, Gregory F.
 Joseph, Sara A.
 Karp, Beth E.
 Kearns, Karen S.
 Kim, Carol A.
 Knezevich, Mary L.
 Kreis, Cathy A.
 Labrecque, Kimberly I.
 LaPoint, Jeffery L.
 Leister, Mary L.
 Lormore, Michael J.
 Manwarren, Trenna L.
 Marrero, Marisol
 Marschman, Kristin
 McNamara, Paul S.
 Mignemi, Donna M.
 Moks, Pamela A.
 O'Leary, Lisa A.
 Ofsie, Susan
 Pagliaro, Michael S.
 Plotkin, Michael O.
 Puerto, David A.
 Rassnick, Kenneth M.
 Reiss, Adam
 Richards, Amy
 Robinson, Timothy M.
 Rocchio, Christopher J.
 Romano, Virginia S.
 Rubenstein, Jennie
 Rummel, David P.
 Santisi, David S.
 Sarna, Carolyn S.
 Schanbacher, Barbara J.
 Schunk, Kristina L.
 Scrivani, Peter

Seagren, Mary Ann
 Sikora, Nancy K.
 Smith, Miranda P.
 Thode, Barbara C.
 Valdes, Richard
 Waddell, Lori S.
 Wells-Eisenhaure, Hannah
 Wilson, Georgette D.
 Wratten, Wayne D.
 Young, Sandra E.
 Zelinski, Karen

Class of 1994

Adelsohn, Deborah S.
 Appel, Leslie D.
 Arasukavalar, Prema
 Arrington, Edward L.
 Balacich, Michele M.
 Barry, Amanda M.
 Bertoldo, Jon P.
 Bowers, Jeremy G.
 Brown, Cynthia A.
 Brown, Thomas J.
 Buchholz, Lawrence J.
 Calyer, Lauren T.
 Carpenter, Kelli S.
 Cho, Jane
 Cockburn, Tregel M.
 Collins, Brian G.
 Corcoran, Pamela A.
 Cromie, Bonny R.
 Daly, Holly A.
 Das, Helena H
 Dattner, Michael J.
 Davies-Brown, Fiona E.
 Dezan, Jeanette L.
 DiGiovanni, Maria E.
 Fagraeus, Charlotte E.
 Fernandez, Luis R.
 Fischman, Suzanne
 Flores, Anthony M.

Focacci, Mark J.
 Freiman, Schlomo
 Friedhofer, Ann L.
 Gardner, Jennifer M.
 Goggin, Justin
 Goldman, Elizabeth E.
 Goodman, Leah K.
 Griffin, Mary J.
 Hanchett, Lori A.
 Hulse, Michelle P.
 Impellizeri, Joseph A.
 Jarvis, Emily R.
 Jones, Linda Kathy
 Kelly, Khayya L.
 Koren-Roth, Yossi
 Lee, David E.
 Le Leonnec, Mark L.
 Lewis, Jane M.
 Lucia-Jandris, Patricia
 Maldonado, Christina P.
 McArthur-Wicks, Deborah A.
 McAvoy, Sandra J.
 Moslock, Brenda L.
 Moyle, Robin B.
 Nichols, Elizabeth
 Northrup, Nicole
 Pacy, John M.
 Padilla, Anthony W.
 Petrillo, Suzanne M.
 Pizano, Sara
 Potter, Adam M.
 Pugh, Nancy L.
 Rath, Amy K.
 Reimann, Justie L.
 Richter, Julie A.
 Riskin, Gregory S.
 Schoenborn, William C.
 Schwartz, Beth F.
 Schwartz, Debra E.
 Shaw, Nancy
 Smith, Charla
 Smith, Julia M.

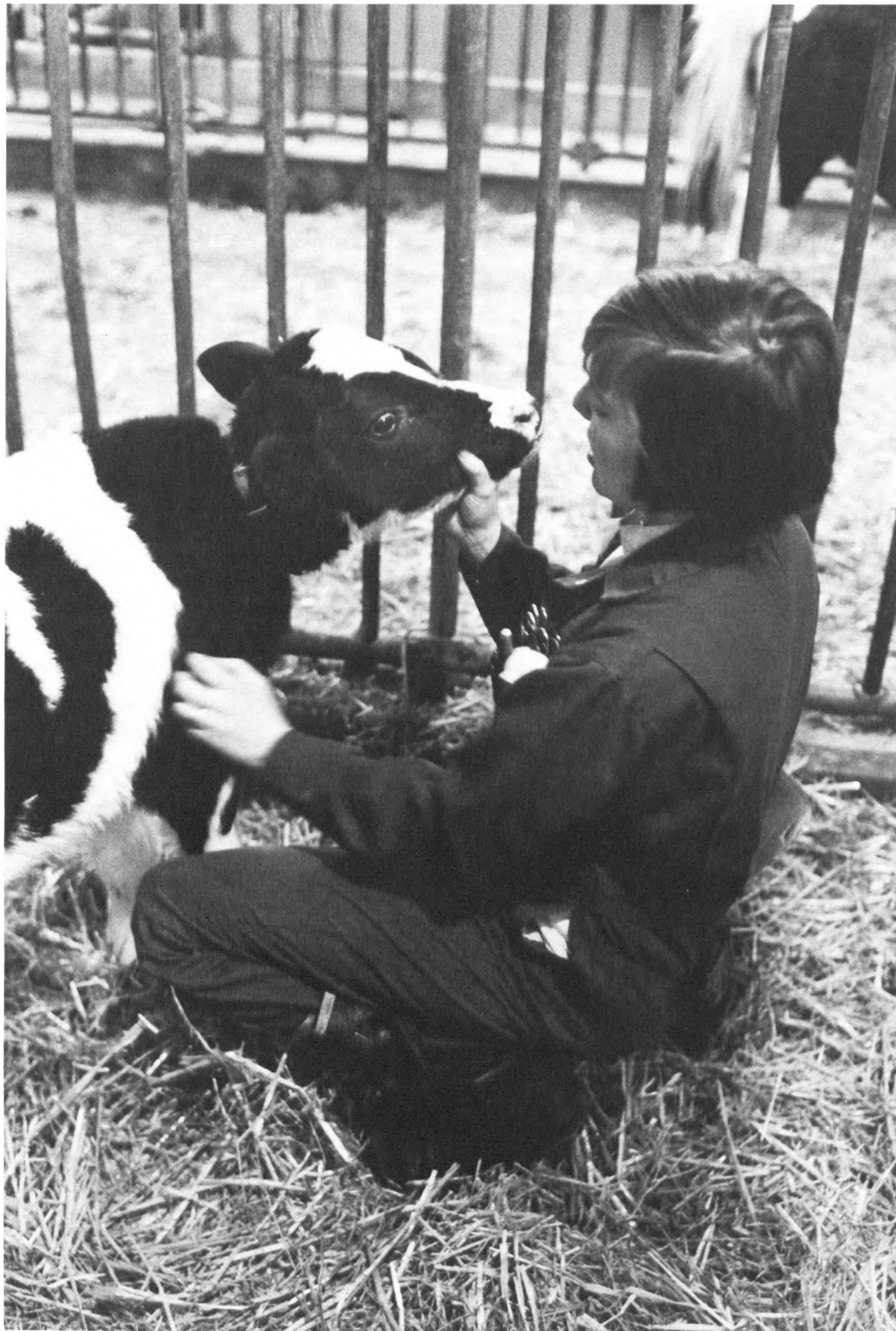
Solomon, Robin K.
 Sparks, Jennifer R.
 Sponseller, Brett A.
 Thall, Emily E.
 Tighe, Ellyn K.
 Tobin, Regina L.
 Walcoff, Jeffrey
 Wicinski, Joseph M.
 Willsey, Amy L.
 Zabell, Ari S.
 Zane, Suzanne

Class of 1995

Ackerman, David P.
 Antczak, Karen M.
 Beauvais, Cassandra H.
 Beccari, John F.
 Belanger, Lia L.
 Benner, William L.
 Blank, Lynn E.
 Bluestone, Pamela A.
 Book, Glenn W.
 Brockett, Charles C.
 Coester, Sandra C.
 Colon, Jorge L.
 Conway, Teresa A.
 Covalesky, Maria E.
 Davidow, Elizabeth B.
 Dee, Andrea L.
 de Papp, Erika D.
 Dippel, Peter W.
 Dobyns, Kathryn A.
 Dugger, Dee A.
 Duryea, Jonathan H.
 Fahey, James R.
 Forlano, Bartholomew F.
 Fortna, Carl H.
 Gellman, Karen
 Glass, Eric N.
 Gould, Kathleen M.
 Harr, Kendal E.

Hiller, Ruth E.
 Hoskins, Virginia M.
 Isaacs, Danielle
 Jackson, Tanya
 Jackson, William A.
 June, Vicki L.
 Kaplan, Steven L.
 Kayser-Laundry, Nicole A.
 King, Dana S.
 Klemenger, Cathy O.
 Kramer, Monique T.
 Kusel, Amy B.
 La Porta, Katherine G.
 Lawler, Mary K.
 Leavey, Kathleen M.
 Lewis, Bethann L.
 Livingston, Christina
 Lopez, Andrew C.
 Lyons, Jeanette M.
 Madriaga, Alfredo R.
 Marghoob, Azra B.
 McMichael, Maureen A.
 Mensching, Donna A.
 Moran, Karen J.
 Morris, Linda I.
 Mullings, Suzanne J.
 Nail, Sophia R.
 Newman, Andrew S.
 Nolte, Diane P.
 Olcott, Mark D.
 Petrie, Jacquelyn L.
 Pikul, Jennifer E.
 Pla, Jose S.
 Puccio, Margaret
 Raciti, Mary A.
 Reid, Holly R.
 Rekers, Wendi L.
 Rhein, Alison G.
 Ries, Stacey A.
 Rorke, Mary K.
 Rosaly, Charles H.
 Simmerman, Dawn A.

Smith, Karen J.
 Stoneham, Anne E.
 Terrelonge, Carol M.
 Tidd, Lucy C.
 Traugott, Kim T.
 Uhler, Brenton D.
 Van Gessel, Yvonne A.
 Vardy, Kristen
 Von Keyserling, Elizabeth D.
 Weaver, Dusty M.
 White, Eugene C.
 Zahorsky, Joanne L.



Herd health management is one of the many services offered by the Teaching Hospital. Here, an ambulatory clinician evaluates the condition of a Holstein dairy calf.

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 \$10,100 a year for New York State residents and \$12,500 a year for nonresidents. Most students in the college do not live in university housing. The cost of room and board in Ithaca for 1991-92 is estimated at \$6,150. Books, instruments, and supplies cost approximately \$690 a year. An additional allowance of \$3,400 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 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 March 1 of the academic year for which aid is requested.

Loan Funds

Sources for loans to veterinary students are as follows: 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 Stafford Loan Program (formerly Guaranteed Student Loan), the Health Professions Student Loan Program, Perkins Loans (formerly National Direct Student Loans) and certain other loan funds administered by Cornell University. Most guaranteed loans defer interest or principal payments until the student has left school. Interest rates vary according to the source of the loan, and certain short-term loans are interest free.

Other guaranteed student loans available provide partial or no interest subsidy: Supplemental Loans for Students (SLS) and the Health Education Assistance Loan (HEAL).

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. Scholarship Committee evaluations and recommendations are completed at the end of the spring semester. Scholarship stipends are credited by the university bursar for the award year. Students interested in securing other forms of financial assistance should contact the college director of financial aid.

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

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, estab-

lished 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.

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 1941 Scholarship - established in 1991 as the class's 50th reunion gift.

Class of 1945 Scholarship - established in 1990 as the class's 45th reunion gift.

Class of 1946 Scholarship - established in 1991 as the class's 45th reunion gift.

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 as their 40th reunion gift, to be awarded with a preference for married students with children.

Class of 1951 Scholarship - established in 1991 as the class's 40th reunion gift.

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 1960 Scholarship - established in 1990 as the class's 30th reunion gift.

Class of 1961 Scholarship - established in 1991 as the class's 30th reunion gift.

Class of 1965 Scholarship - established in 1990 as the class's 25th reunion gift.

Class of 1970 Scholarship - established in 1990 as the class's 20th reunion gift.

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 as the class's 15th reunion gift.

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.

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.

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. The award is intended for graduates of the College of Agriculture and Life Sciences, with preference given to 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.

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.

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

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

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. Delabanty Memorial Prize for interest and proficiency in equine practice.

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 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 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 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 Norden Distinguished Teacher Award for demonstrated continued excellence in teaching.

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.

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.

As an extracurricular activity, the Veterinary Players produce and direct a theatrical performance.



Student Life

Housing and Dining

Off-Campus Housing

Most D.V.M. 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, situated 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: 607 253-8581).

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 SCAVMA symposium, which is held at a different school of veterinary medicine each year. Cornell Chapter of SCAVMA officers for 1991-92 are: President - Laura Eirmann, '93; Vice president - Emily Thall, '94; Secretary - Virginia Romano, '93; Treasurer - Mike Pagliaro, '93; 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, and Research-Oriented Veterinary Students.

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.

Student representatives from national and international veterinary colleges have the opportunity to participate in the Leadership Training Program for Veterinary Students.



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 international veterinary medical projects in developing countries. All D.V.M. students in good academic standing are eligible to apply. Proposals for interna-

tional projects must include a statement of intent, information about 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 two years, the College of Veterinary Medicine at Cornell has hosted the Leadership Training Program for Veterinary Students. The program targets gifted students from Cornell and other veterinary colleges who have the potential to be leaders in the profession. Major objectives of the program are to acquaint the participating students with career opportunities for veterinarians in academic institutions, government, and industry; to assist them in planning their professional activities; and to establish a network that will encourage interaction among students in their careers.

Successful applicants for admission to the program are awarded fellowships that will enable them to spend 10 weeks at Cornell, from June 7 to August 15, 1992. Student fellows will engage in faculty-directed research. They will also 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 \$3,000 honorarium; free in-residence housing; research experience; seminars and conferences; a visit to the research facilities of Merck Company; and a career counseling day at Cornell. Application forms for admission to the 1992 program may be obtained by writing to Ms. Linda Griswold, Graduate Education Coordinator, College of Veterinary Medicine. Deadline for applications is January 3, 1992.

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 Black American, Hispanic, American Indian, 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.

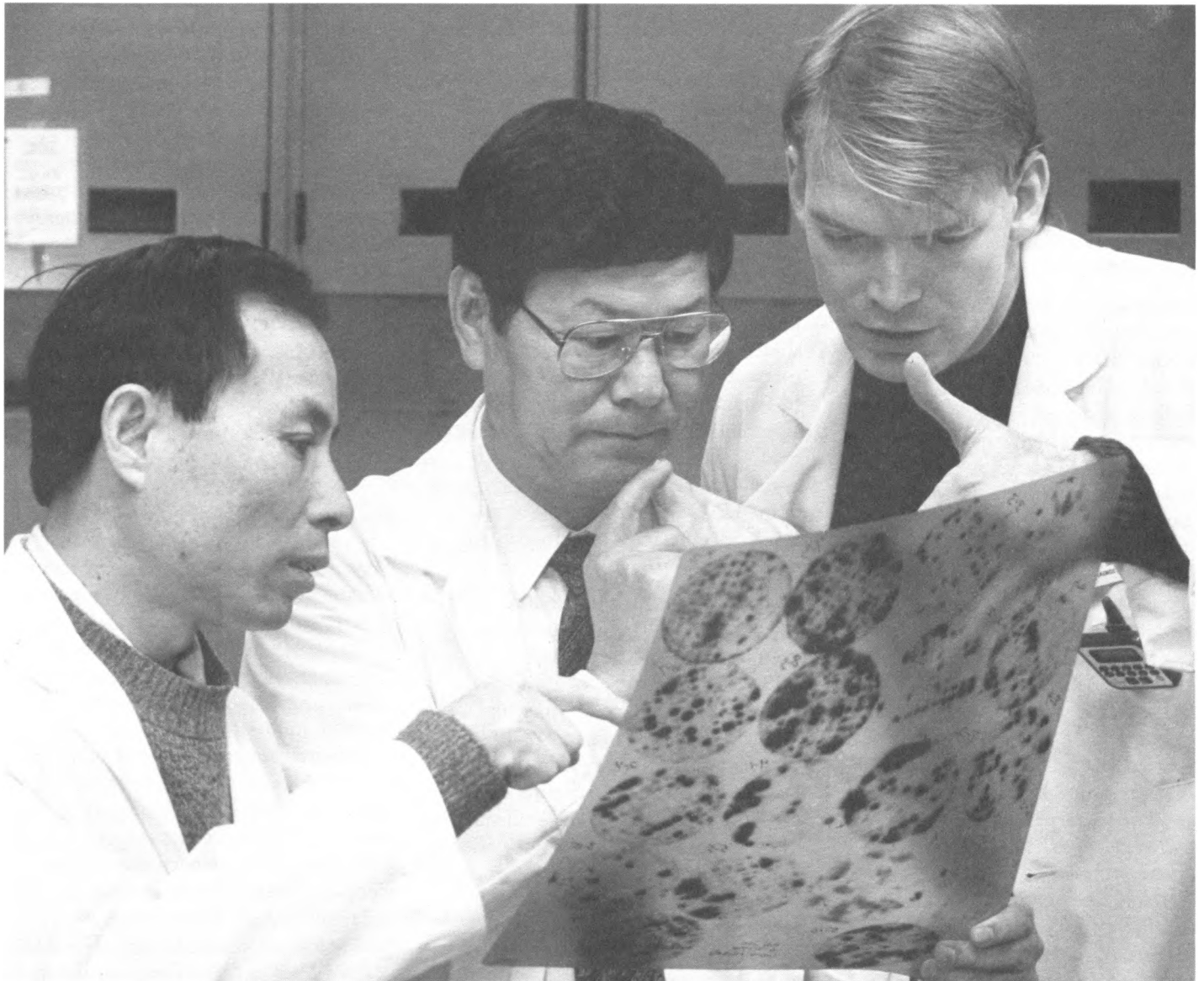
High School Students

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.

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 Black American, Hispanic, American Indian, 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.



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, Molecular and Cell Biology, 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 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.

An applicant may not simultaneously apply for admission to the D.V.M. and Ph.D. programs. 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 his or her choice. In addition to membership of the graduate faculty of that field, the student's major professor must be 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: "Graduate Program in Cellular and Molecular Medicine" and "Graduate Training 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 access 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 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 \$8,300 a year) and a minimum salary of \$18,000 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 13, 1991.

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 10, 1992.

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).

Graduate Students 1991-92

Field of Veterinary Medicine

Graduate Faculty Representative:
Professor J. F. Timoney
C-324 Schurman Hall
607 253-3391

Atwill, E. Robert, D.V.M., M.P.V.M.
Augustine-Voss, H. (West Germany), D.V.M.
Barbis, Dina, B.S., D.V.M.
Barr, Peggy, B.S., D.V.M.
Bastida, Felix (Spain), D.V.M.
Bezek, David, B.S., D.V.M.
Burns, Gilbert, B.S., D.V.M.
Carter, Alison, B.S., M.Eng.
Chang, Shwu-Fen (Taiwan), B.S., M.S.
Chen, Hong-Chen (Taiwan), B.S., M.S.
Cheng, Li-Lin (Taiwan), B.V.M.
Cleveland, Patricia, A.B.
Coleman, Barbara, B.S., M.S.
Crameri, Flavio (Switzerland), D.V.M.
Eicker, Steven, B.S., M.S., D.V.M.
El-Sabban, Marwan (Lebanon), B.Sc.
Feltham, Joanna, B.A.
Feverheiro, Miguel (Portugal), D.V.M.
Glaser, Amy, B.A., D.V.M.
Hackett, M. Susan, B.S., D.V.M.
Harman, Jane, B.S., M.S., D.V.M.
Hendrickson, Dean, B.A., D.V.M.
Hsu, Hui-Min, B.V.Sc.
Hu, Liang-biang (P.R. China), D.V.M., M.S.

Johnson, Robert, B.S., D.V.M.
Jure, Maria (Uruguay), B.S., D.V.M.
Karaca, Kemal (Turkey), D.M.V., M.Sc.
Kenny, Kevin (Ireland), M.V.D.
Lin, Dah-Sheng (Taiwan), B.V.M., M.S.
Martineau, Daniel (Canada), D.V.M., M.Sc.
McGrodsky, Kathleen, B.S.
Miller, Timothy, B.S., M.S., D.V.M.
Min, Churl Ki (Korea), B.S., M.S.
Mittal, Rohit (India), M.Sc.
Ngichabe, Christopher (Kenya), B.V.M., M.Sc.
Obasanjo, Iyabo (Nigeria), D.V.M., M.P.V.M.
Ohashi, Kazuhiko (Japan), D.V.M., M.S.
Olsen, Christopher, B.S., D.V.M.
Perdrizet, John, B.A., D.V.M.
Peters, David, D.V.M.
Platko, Joseph, B.S., M.S.
Pouloupoulou, C. (Greece), B.S.
Rehder, Renata (Brazil), D.V.M.
Reiser, Raoul, B.S.
Renshaw, Randall, B.S., M.S.
Revah, Irma (Mexico), D.V.M., M.P.V.M.
Reynolds, Arleigh, B.S., D.V.M.
Saliki, Jeremiah (Cameroon), D.V.M.
Sams, Andrew, B.S., D.V.M.
Spielholz, Joan, B.S.
Stafford, Grace, A.B.
Stoffregen, Dana, B.S., D.V.M.
Thomas, Philip (Australia), B.V.Sc.
Todhunter, Rory (Australia), B.V.Sc., M.S.
Volpini, Lucy, B.A., D.V.M.
Ward, Jeffrey, B.A., D.V.M.
Warnick, Lorin, B.S., D.V.M.
Willard, James, B.A., B.S., M.S.
Winand, Nena, B.S., M.S., D.V.M.
Wo, Zhuang-Qun, B.Sc.
Xu, Yuhong (P.R. China), M.D.

Field of Physiology

Graduate Faculty Representative:
Professor John Wootton
818 Veterinary Research Tower
607 253-3465

Bartlett, Heather, B.S.
Baustian, Mark, B.S., M.S.
Bay, Anik (Canada), B.Sc.
Calnek, David, B.A.
Dobrov, Tamara, B.A.
Ensign, Allison, B.A.
Entin, Pauline, B.A.
Freire, Carolina (Brazil), B.Sc., M.Sc.
Glasser, Adrian (S. Africa), B.S., M.S.
Kim, Marshall, B.S.
Li, Tong (PRC), M.D., M.S.
Matamoros, R. (Honduras), D.V.M., M.S.
Oviedo, Agueda, B.S.
Pacioretty, Linda, B.S., M.S.
Reisner, Ilana, B.A., D.V.M.
Sadowsky, Drew, B.A.
Shen, Linming (P.R.China), B.S., M.S.
Stock, A. (Germany), D.V.M., Ph.D.
Tang, Shaohua (P.R.China), M.D., M.S.
Tian, Jean (P.R. China), M.D., M.P.H.
Tian, Xiuchun (P.R.China), B.S., M.S.
Tomasi, Ana (Argentina), M.D.
Turzillo, Adele, B.A.
Watanabe, Mari (Japan), M.D.
Yang, Hosook (Korea), B.S., M.S.
Zhang, Dai-wei (P.R.China), M.B.
Zhang, Hong (P.R.China), B.S., M.M.

Field of Immunology

Graduate Faculty Representative:
Professor Rodney R. Dietert
216 Rice Hall
607 255-7789

Borschel, Richard, M.A., B.S.
Boschwitz, Jeffrey, B.S.
Chandratilleke, D. (Sri Lanka), B.V.Sc., M.S.
Chang, Wan-Pin (Taiwan), B.S.

Ellis, Laurie, B.S.
Elzer, Philip, B.S., M.S.
Grunig, Gabriele (Germany), D.V.M.
Hanson, Laura, B.S.
Jia, Wei (P.R. China), D.V.M., M.S.
Llana, Ted, B.S.
Maher, Julie, D.V.M.
Otubu, Oti (Nigeria), B.S.
Pratt, William, B.S., M.S., D.V.M.
Rivas, Ariel (Uruguay), D.V.M., M.S.
Thompson, Gertrude (Mozambique), D.V.M., M.Sc.
Tokman, Michael, B.S., M.S.
Vella, Anthony, B.A., M.S.
Zhang, Chonghui (P.R. China), B.S., M.S.

Field of Microbiology

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

Campbell, Barbara, B.S.
Kim, Carol, B.S.

Field of Toxicology

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

Conboy, James, B.S., M.S.
Fadden, Mary Hoover, D.V.M.
Fisher, Jeffrey, B.S.
McLaughlin, Lee, A.B.
Poulet, Frederique (Belgium), D.V.M.
Vancutsem, Paul, D.V.M.

Field of Biochemistry

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

Carraway, Kermit, B.S.
Guy, Pamela, B.S.
Hart, Matthew, B.S.

Field of Zoology

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

Schutt, William A., B.S.

Field of Neurobiology and Behavior

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

Vasquez, Raymond, A.A., B.S.

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



Internships and Residencies

Intern Program

Intern programs of the Veterinary Medical Teaching Hospital are available in the Ambulatory Clinic, the Large Animal Clinic (surgery), and the Small Animal Clinic (medicine and surgery).

Objectives

The intern program is a non-degree program that provides training for practice, clinical teaching, and specialty board eligibility. A one-year intern program with rotation in medicine and surgery is a prerequisite for most residency programs and for board certification. The intern program provides postgraduate education toward a high level of clinical proficiency.

Program

Interns in the Small Animal Clinic are assigned on a rotating basis to the various medical and surgical services and the anesthesiology service. Each service consists of one faculty member, a resident, and an intern. Fourth-year students are assigned to these services during the academic program. Interns in the Ambulatory Clinic are assigned to one of four services, each of which is the responsibility of one faculty member.

Schedules are arranged so that the intern has the opportunity to work with most of the faculty in the area of the program selected. Interns in the Large Animal Clinic are assigned to the surgical service and are responsible to the faculty in the Section of Large Animal Surgery.

Interns share weekend duty and the responsibility for emergency service on a rotating basis with faculty available for consultation. The resident assigned to the service is responsible for the direct supervision of the intern and, along with the faculty member, evaluates the performance of the intern at the end of rotation.

Interns are expected to attend and participate in hospital rounds and seminars. With permission of the director of interns, any intern 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.

Clinical Residency Program

Residencies are offered in anesthesiology, dermatology, large animal medicine, large animal surgery, ophthalmology, small animal medicine, small animal surgery, theriogenology, and the ambulatory clinic. The training programs are directed toward specialty board certification.

Objectives

- To educate the resident to a high level of academic and clinical proficiency in a specific clinical discipline.
- To fulfill the postgraduate education requirements of the various specialty boards.
- To provide the resident experience in the methodology of professional veterinary medical education and experience in clinical teaching.
- To assist in providing a high level of specialized veterinary service to the public and the profession.

Program

Each resident is supervised by the section chief of the specialty and designated faculty in the section.

The residency program consists of advanced training in a specific clinical discipline. Progression through the program leads to increased responsibility. Descriptions of each of the specific residency programs are available from the director of the Veterinary Medical Teaching Hospital.

Each clinical service consists of one faculty member and a resident or intern or a faculty member, resident, and intern. Fourth-year students are assigned to the service during the academic program. The resident is responsible for the direct supervision of the intern on the service and participates in the clinical teaching of the fourth-year students. Residents have the opportunity to work with all the faculty in the discipline of the residency.

A minimum of two calendar years is required for successful completion of the program (three years in small animal surgery, large animal surgery, ophthalmology, 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, and disciplinary competence is the primary training goal. Applicants to the program with no prior training in veterinary pathology would seek admittance as a first-year resident. Others, with some previous experience, would apply for appointment at the second- or third-year levels.

Resident Program in Anatomic Pathology

This is a two- or three-year program, depending on the experience and career goals of the trainee. During the first two years of training, the trainee receives comprehensive exposure in anatomic pathology. Within this training format, the trainee acquires 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.

Resident Program in Clinical Pathology

The training program in clinical pathology is a two- or three-year program, depending on the experience and career goals of the trainee. During the first two years, the resident acquires 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

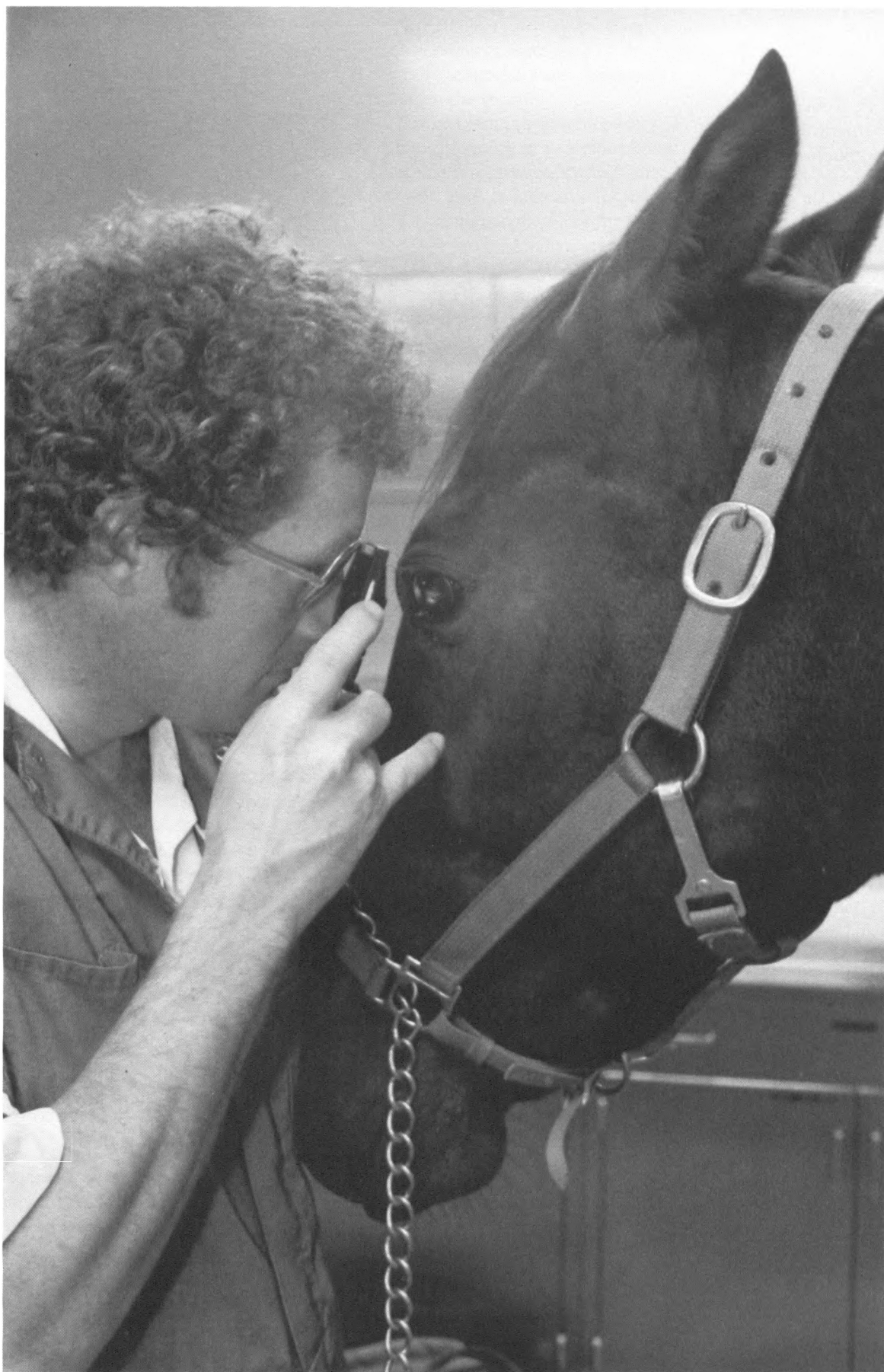
faculty members in clinical pathology. A period of participation in the surgical pathology service, the length of which is determined on an individual basis, is provided for each resident. Residents develop their abilities to interpret laboratory results and morphologic patterns and to relate observations 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. Residents are asked to take full advantage of the seminars and educational activities sponsored by the Department of Pathology.

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.



During an ophthalmologic evaluation in the Large Animal Clinic, a veterinarian examines an equine retina for abnormalities.

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, has 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 1,400 periodicals and series titles. This represents a worldwide selection of veterinary titles plus publications in the biomedical sciences designed to support undergraduate, graduate, and research programs. Through the various libraries on campus, nearly five million 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, online literature searching, interlibrary loan, photoduplication, and current awareness. In particular, the computer-assisted literature search

service, called COMPASS at Cornell, provides rapid access to numerous bibliographic databases, including MEDLINE, CAB ABSTRACTS, and BIOSIS. Current awareness bibliographies also can be generated each month through those online systems.

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, and database management 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 of Veterinary Medicine are devoted to teaching and care deeply about the quality of student 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. 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.

In a recently initiated program, faculty are invited to submit proposals for the development of innovative curricular course materials. Successful proposals have included the development of teaching materials for cross-sectional anatomy and radiography, case-based computerized teaching, the development of problem sets that integrate the clinical aspects of a case with knowledge in the basic sciences, and the development of a variety of computer courseware including animations, simulations, tutorials and an image database for pathologic slide, smears, and photographs. The development of these innovations rely heavily on input from students, who are involved in almost all of the projects. They help develop a variety of curricular materials in several disciplines and are involved in the development and testing phases of computer courseware.

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.

Computer Facility

The college has developed an integrated hospital computer system designed to meet the operational, administrative, and research needs of the teaching hospital. The interactive online 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 professional staff in the hospital. The varied caseload available in the hospital assures that all students will receive adequate experience in both large and small animal species and in primary care medicine as well 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 eight 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.

The 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 costly waste of mastitis. Approximately 5,000 visits were made to farms annually. Bacteriological cultures from cows and bulk milk tanks are examined for both the diagnosis of mastitis and more importantly for surveillance to prevent mastitis. The QMPS-Mastitis laboratory and field research have recently made major contributions in the

diagnosis, treatment, control, and prevention of several infectious causes of mastitis including agents such as *Streptococcus agalactiae*, other streptococcus spp., staphylococcus spp., enterococci spp., 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. The regional laboratories are also being equipped and personnel being trained to become diagnostic satellite laboratories for all species with expertise in general bacteriology and rapid serologic testing. The Geneseo laboratory has been providing this service for the last year. 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

The 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 is 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.

In recent years, facilities have been renovated and expanded to accommodate increased program activity. Among the added facilities are buildings for the breeding and rearing of specific-pathogen-free dogs and laboratory rodents and two new service laboratories. One of these units is dedicated to the production of monoclonal antibodies using cell hybridization techniques. In the other laboratory, researchers analyze particles and cells by flow cytometry. Projects conducted here also involve recombinant DNA techniques, cell hybridization, and embryo manipulation.

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 chicken and duck industries are produced at Eastport.

A diagnostic and investigative program has been established at the Marine Biological Laboratory, Woods Hole, Massachusetts, to study the health of marine animals. Supported by the National Institutes of Health, its goals are to investigate disease outbreaks and develop diagnostic methods for recognizing infectious, parasitic, and toxicologic diseases. Colonies of aquatic animals, especially invertebrates, are being developed as defined laboratory animals for research.

At the college, 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 hour 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.

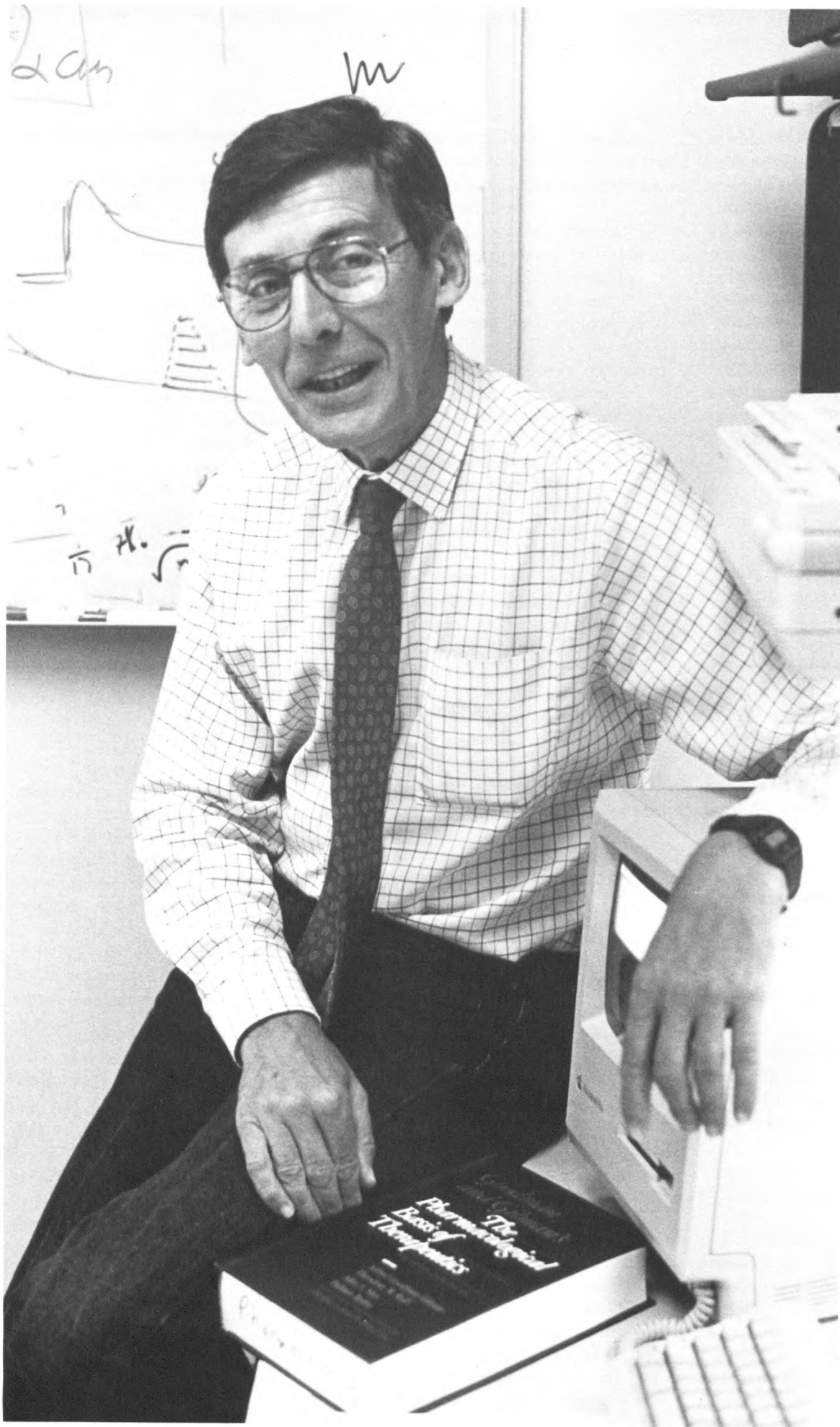
Cornell Feline Health Center

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, and for the development of the ELISA test for the detection of coronaviral antibodies in feline serum.

Educational outreach is accomplished primarily through 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, bequests, the memorial program, memberships, and grants from government, industry, and foundations. Some of the noteworthy funds that have been established are the Camuti Fund in support of the feline diagnostic and consultation service and the Buzz-Fuzz Harder Fund for cardiomyopathy studies.



The members of the faculty and administration are readily accessible for student needs.

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*

John C. Semmler, *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*

Leland E. Carmichael, *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*

Elizabeth A. Fontana, *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

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; director of the James A. Baker Institute for Animal Health

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

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

de Lahunta, Alexander, D.V.M., Ph.D.; anatomy

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

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

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

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

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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

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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

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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

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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

Timoney, John F., M.V.B., M.S., Ph.D., D.Sc.; bacteriology

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

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

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

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

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

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

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 Rendano, Victor T., V.M.D., M.S.;
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 Riis, Ronald C., M.T., A.S.C.P.,
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 Scarlett, Janet M., D.V.M., M.P.H.,
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 Schlafer, Donald H., D.V.M., M.S.,
 Ph.D.; pathology
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 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.; pharmacol-
 ogy
 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, Ph.D.; anatomy
 Beck, Kathy A., D.V.M.; radiology
 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
 Kawula, Thomas H., M.S., Ph.D.;
 bacteriology
 Levine, Roy, M.A., Ph.D.; pathology
 Lopez, Jorge W., M.S., Ph.D.; virology
 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.; epidemiol-
 ogy
 Nowak, Linda M., Ph.D.; pharmacology
 Parrish, Colin R., Ph.D.; virology
 Pearce, Edward J., Ph.D.; immunology
 and parasitology
 Spitsbergen, Jan M., D.V.M., Ph.D.;
 aquatic animal medicine
 Suter, Maja M., Dipl.Med.Vet.,
 Dr.Med.Vet., Ph.D.; pathology
 Yeager, Amy E., D.V.M.; radiology

Senior Clinician

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

Senior Lecturers

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.; pathol-
 ogy
 Concannon, Patrick W., M.S., Ph.D.;
 physiology
 Fullmer, Curtis S., M.N.S., Ph.D.;
 physiology
 Gonzalez, Ruben N., D.V.M.,
 M.P.V.M., Ph.D.; microbiology

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

Hackett, Susan M., D.V.M.; anatomy
 Gallagher, David P., M.S.; practice
 management
 Mizer, Linda A., D.V.M.; anatomy
 Paul, Eileen C.A., Ph.D.; physiology

Instructors

Anderson, Karen L., D.V.M.; pathology
 Barr, Margaret, D.V.M.; microbiology
 Butt, Mark T., D.V.M.; pathology
 Looney, Andrea L., D.V.M.; anesthesis-
 ology
 Reynolds, Arleigh, D.V.M.; nutrition,
 medicine
 Rawson, Richard E., D.V.M., Ph.D.;
 physiology
 Rowland, Peter H., D.V.M.; pathology

Field Veterinarians

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

Sandhu, Tirath S., M.S., Ph.D.; avian medicine (Eastport)

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

Geary, Jack C., D.V.M.; radiology

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

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

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

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

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

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

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 1991-1992**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*)

J.F. Timoney (1989-92), field representative

P.R. Bowser (1990-93)

E.J. Dubovi (1989-92)

C. Guard (1989-92)

G. W. G. Sharp (1992)

University Appeals Panel (*Elected by faculty*)

J.T. Blue (1989-94)

L.E. Carmichael (1988-93)

A. Dobson (1987-92)

H.J. Harvey (1990-95)

T.J. Reimers (1991-96)

Faculty Council of Representatives (*Elected by faculty*)

B.A. Ball (1989–92)
 E.J. Dubovi (1990–93)
 C.E. Farnum (1990–93)
 R.F. Gilmour (1989–92)
 J.W. Hermanson (1989–92)
 V.N. Meyers-Wallen (1990–93)
 G.A. Weiland (1990–93)

Faculty Curriculum Committee (*Elected by faculty*)

J.G. Babish (1/90–12/91)
 S.A. Center (1/90–12/91)
 C.E. Farnum (1/90–12/92)
 J.A. Flanders (1/90–12/92)
 R.P. Hackett (1/90–12/91)
 K.A. Schat (1/90–12/92)
 F.W. Scott (1/90–12/91)
 M.M. Suter (1/90–12/91)
 J.F. Wootton (1/90–12/91)
 K.M. Edmondson, ex officio
 D.F. Smith, ex officio

SUNY Senate (*Elected by faculty*)

G. Lust, senator

Admissions Committee

T.J. Kern (1990–92), chairperson
 M.J. Appel (1990–92)
 A. de Lahunta (1991–93)
 T.W. French (1991–93)
 S.L. Fubini (1991–93)
 K.A. Houpt (1991–93)
 W.S. Schwark (1991–93)
 E.G. Kelman, ex officio

Committee on Scholarships

H.J. Harvey, chairperson
 S.A. Center
 R.M. Lewis
 E. Loew
 A.J. Nixon
 D.N. Tapper
 G.R. Crissey, ex officio
 J.C. Semmler, ex officio

Committee on Deficient Students

R.C. Riis, chairperson
 A. Dobson
 C.M. Fewtrell
 M.M. Suter

Committee on Student Conduct

J.W. Casey
 F.H. Fox
 J.F. Randolph
 M.C. Smith

International Advisory Committee

S.G. Campbell, chairperson
 L.E. Carmichael (1992)
 R.N. Gonzalez (1993)
 R.H. Jacobson (1992)
 F.A. Kallfelz (1993)
 D. Robertshaw (1992)
 S.J. Shin (1994)

Veterinary Animal Use and Care Committee

J.G. Babish
 B.J. Cooper
 J.W. Hermanson
 J.W. Lopez
 V.N. Meyers-Wallen
 S.A. Naqi
 J.F. Timoney
 D. Robertshaw
 D.D. McGregor, ex officio
 F.W. Quimby, ex officio

Committee on the Use of Live Animals in Teaching

P.W. Concannon
 L.A. Dillingham
 J.E. Fortune
 S.L. Fubini
 J.W. Ludders
 L.M. Nowak
 B.A. Summers

Committee on the College Library

D.M. Ainsworth
 A. Dobson
 B.R.H. Farrow
 R.E. Oswald
 J.M. Spitsbergen
 S.K. Whitaker, ex officio
 D.D. McGregor, ex officio
 D.F. Smith, ex officio

Pharmacy and Therapeutics Committee

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

Special Committees 1991-92

Continuing Education Committee

L.A. Ritzler, program coordinator
 T.J. Divers
 F.H. Fox
 W.J. Gould
 H.J. Harvey
 W.H. Miller
 W.C. Rebhun
 W.S. Schwark
 J.E. Saidla, ex officio

Senior Seminar Committee

F.H. Fox, chairperson
 A. de Lahunta
 T.R. Houpt
 J.M. King
 M.C. Smith
 A.E. Yeager

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

B.J. Cooper
 Y.T. Grohn
 R.H. Jacobson
 H.O. Mohammed
 R.E. Oswald
 S.D. Rutherford, ex officio
 D.F. Smith, ex officio

College Research Council

E.J. Dubovi (1989-92), chairperson
 R.R. Minor (1991-94)
 R.E. Oswald (1990-93)
 J.M. Scarlett (1990-93)
 K.A. Schat (1989-92)
 B.C. Tennant (1990-93)
 J.F. Timoney (1991-94)
 D.D. McGregor, ex officio

James Law Lecturer Series Committee

R.G. Bell
 B.J. Cooper
 B.R.H. Farrow
 P.W. Nathanielsz
 B.U. Pauli
 R.H. Wasserman

Affirmative Action Committee

S.A. Naqi, chairperson
 R.G. Bell
 C.M. Fewtrell
 M.C. Smith
 A. Yen
 R.W. Harris, ex officio
 S.J. Seldon, ex officio

Central Planning Committee (CPC) for the Facilities Master Plan

B.W. Calnek, chairperson
 R.J. Avery
 B.R.H. Farrow
 F.A. Kallfelz
 J.A. Lambert
 D.H. Lein
 D.D. McGregor
 D.F. Smith
 W.S. Schwark
 J.C. Semmler
 R.J. Webster, Jr.

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

Biotechnical 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.

Donald R. Davidsen, D.V.M.
New York State Assembly

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

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

Stephen J. Kleinschuster
Rutgers Shellfish Research Laboratory

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

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



Veterinary students begin their education by learning the anatomy of the dog, horse, cow, small ruminants, pig, bird, and fish.

Description of Courses

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 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
607 253-3540

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

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. C.E. Farnum (coordinator); A. de Lahunta; M.S. Hackett; L.A. Mizer.

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, post-mortem 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 pre-implantation, 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 control-

ling 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 student laboratory 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)]

Fall. 1 credit. Not offered fall 1991. 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.]

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, following the general approach of disease control through preventive medicine. 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 Institute 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: A. de Lahunta, B.R.H. Farrow, F.H. Fox, W.C. Rebhun, D.W. Scott, B.C. Tennant; M.E. White (chief); associate professors: S.A. Center, T.J. Divers, 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

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; instructor: A.L. Looney

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

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

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 knowl-

edge 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 28 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. Grohn; 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. K.A. Beck (coordinator); N.L. Dykes; V.T. Rendano; A.E. Yeager.

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)

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 and spring. 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 and spring. 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; G.D. Mechor; M.C. Smith (coordinator); 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 Anesthesia

Fall and spring. 2 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 and spring. 2 credits. Required of all fourth-year veterinary students. Not open to others. Letter grades only. K.A.

Beck (coordinator); N.L. Dykes; V.T. Rendano; A.E. Yeager.

This two-week clinical rotation in diagnostic veterinary radiology provides the student with technical and interpretive aspects of radiology in clinical, laboratory, and autotutorial settings. Radiographic examples of common large and small animal disease conditions are available for study in an autotutorial teaching film file. Under the guidance of the radiology faculty and staff, students participate in radiographing and interpreting radiographs of patients in the Veterinary Medical Teaching Hospital. Four, three-hour laboratory sessions are given in which the student gains hands-on experience in diagnostic ultrasonography, nuclear medicine, patient positioning for radiography and formulation of a radiographic technique chart. The laboratories familiarize the student with darkroom techniques and radiographic film artifacts. Aspects of radiation safety are discussed.

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 and other large animal surgery and anesthesiology faculty.

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

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 Service

Fall and spring. 4 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.A. 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 and spring. 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 and spring. 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, gonioscopes, 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 and spring. 2 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 and spring. 2-4 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 and spring. 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.

The main objective of this course is to present an introduction 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 non-pregnant 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-Theriology 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.

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. Grohn, 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. Grohn; 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. Grohn (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 675 Special Problems in Large Animal Medicine (Selective)

Fall or spring. Credit to be arranged. Limited to veterinary students. By permission of the instructor. Medicine faculty.

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 Large Animal Obstetrics (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. Maxi-

mum 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.L. 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.

[VETCS 685 Introduction to Practice Management (Selective)]

January. Not offered in 1992. 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. Medical and surgical 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. 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 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.

This course consists of four laboratories performing advanced surgical procedures on ponies. Procedures in this laboratory are performed primarily at referral surgical centers, and it is the intent of this course not to make the students proficient in these techniques, but 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 697 Advanced Techniques in Food Animal Surgery (Selective)

Spring. 1 credit. Limited to third year veterinary students. Letter grades only. S.L. Fubini.

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, and it is the intent of this course not to make the students proficient in these techniques, but 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. Limited to first-, second-, and third-year veterinary students. 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 Llamas and Alpacas (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 llama 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. Not offered 1990-91.]

[VETCS 701 Pathophysiology in Orthopedic Surgery (Graduate)]

Spring, every third year. 1.5 credits. Limited to veterinary interns and residents. S-U grades only. Not offered 1990-91.]

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. Grohn; 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. Instructor to be named.

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 1992, 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: M. Appel, R.J. Avery, R.G. Bell, S.G. Campbell, L.E. Carmichael, R.R. Dietert, G. Lust, D.D. McGregor, F.M. Noronha, F.W. Scott, J.F. Timoney, A.J. Winter; associate professors: D.F. Antczak, J.W. Casey, J. Marsh; assistant professors: J.A. Appleton, D.D. Bowman, Y. F. Chang, T. Kawula, C.R. Parrish, E.J. Pearce; senior lecturer: 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.

The course begins with a consideration of antigens and the molecular basis for antigenic specificity. A discussion follows of the molecular structure, biological functions, and genetic basis of diversity of antibodies, and in vitro interactions of antigens and antibodies. The student is then introduced to the lymphoid system and the cellular

interactions responsible for production of antibodies and immune lymphocytes. This requires a substantial coverage of the genetic control mechanisms imposed by the major histocompatibility complex. The general question of regulation of the immune response, including the unresolved problem of unresponsiveness to one's own body antigens (self-tolerance) is taken up, followed by the final section concerning the manifestations of immunity. These include reactions that are harmful to the body (allergies) as well as beneficial reactions that defend the body against harmful microorganisms and cancers.

[VETMI 316 Basic Immunology Laboratory (also Biological Sciences 307) (Undergraduate)]

Fall, not offered 1991. 2 credits. Prerequisite: a course in basic microbiology or permission of the instructor. Recommended: concurrent enrollment in VETMI 315. Letter grades only. N.L. Norcross.

A series of laboratory exercises illustrate the immunologic concepts presented in VETMI 315. Exercises are designed to give students experience with the stimulation and measurement of an immune response in the rabbit. Techniques to familiarize students with both humoral and cellular immune phenomena are included with the goal of offering tangible, hands-on experience in immunology. Among the methods and techniques offered are agglutination and precipitation methods, virus neutralization and phagocytosis, measurement of the biological activity of complement components, antibody dependent cell-mediated cytotoxicity, T and B cell identification, monoclonal antibodies and the ELISA, antibody production by single cells, lymphocyte blastogenesis, and delayed hypersensitivity.]

VETMI 317 Pathogenic Virology (Undergraduate)

Spring. 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) and VETMI 316 (Basic Immunology Laboratory). Lecture only—2 credits. Lecture and laboratory—4 credits. J. 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 separate from Pathogenic Bacteriology. Each course will be given on alternate years.

[VETMI 318 Pathogenic Bacteriology and Mycology (also Biological Sciences 308) (Undergraduate)]

Spring. 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. T.H. Kawula.

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. 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. D.F. Antczak and D. 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, J.F. Timoney (coordinator), L.E. Winter.

The lectures in veterinary bacteriology are intended to give the veterinary student an understanding of the circumstances and processes by which pathogenic bacteria and fungi enter and cause disease in the different organ systems of animals. Thus the student is given the basis for an intelligent approach to the symptomatology, diagnosis, control, treatment, and prevention of the more important bacterial and fungal diseases in domestic animals. 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 also 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. M.C. Barr.

This course covers viruses that produce important diseases in animals. The first third of the term covers general virology, and the second 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. Carmichael, 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. It 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. M.C. Barr 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, odd-numbered years. Lecture, 1 credit; laboratory and field project, 1 credit (total possible 2 credits may be taken independently), open to nonveterinary students by permission of the instructor. S.G. Campbell.

The objectives of the course are to provide the student with sufficient information to set up a health program for sheep in the northeastern United States and elsewhere, and to ensure that the participants can prepare one for themselves or their clients. The lectures (1 per week) contain sufficient information about 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), demonstrations are provided and the students carry out certain 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 due to availability and current knowledge. Arthropod, protozoan, and helminth parasites are considered.

VETMI 700 The Biology of Animal Viruses and Viral Pathogenesis (Selective, Undergraduate)

Fall. 3 credits. For advanced undergraduates who are properly prepared and veterinary students. By permission of the instructor. Letter grades only. C.R. Parrish.

Lectures focus on the biology of animal viruses and the mechanisms of disease. Current literature and articles are used to systematically explore fundamental principles and recent findings in animal-virus research and the mechanisms by which they cause disease.

VETMI 705 Advanced Immunology Lectures (Graduate)

Spring, even-numbered years. 3 credits. Prerequisite: introductory immunology. Letter grades only. A.J. Winter (coordinator) and staff.

Advanced-level coverage of molecular and cellular immunology, immunoregulation, and the immunology of infectious diseases and tumors.

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. R. Dietert.

Presentations of research investigations by Cornell faculty members, post-doctoral 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. Not offered 1991-92.

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 713 Special Topics in Immunology: Topic to be determined (Graduate)

Spring. 1 credit. Prerequisite: introductory immunology. Enrollment limited. A.J. Winter (coordinator).

This course involves intensive student participation and is not offered on a regular basis.

[VETMI 719 Immunology of Infectious Diseases and Tumors (Graduate)]

Spring, odd-numbered years (first offered spring 1993). Prerequisite: Basic

Immunology Lectures (also Biological Sciences 305) or with consent of the instructor. Letter grades only. A.J. Winter.

Advanced-level coverage of the immunologic basis of diseases caused by selected bacterial, viral, protozoan, and helminthic parasites, and tumor immunology.]

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. Not offered 1991-92.

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 immunopotential 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. Cooper, T.W. French, F.W. Quimby. D.H. Schlafer, B.A. Summers, A. Yen; assistant professors: J.L. Guan, R. 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 and spring. 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 Medicine Rotation (Selective)

Fall or 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 Special Topics in Laboratory Animal Medicine and Science (Selective)

Fall and 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, spring. 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.

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, R.E. Oswald, G.A. Weiland; assistant professors: W.A. Horne, L.M. Nowak

VETPR 528 Pharmacology I

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. C.M.S. Fewtrell 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 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 620 Advanced Clinical Pharmacology (Selective)

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 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 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, alternate years. 2 credits. By permission of the instructor. Lecture-discussion, 2 hours each week. Letter grades only. C.M.S. Fewtrell.

Calcium as second messenger; regulation of intracellular calcium and techniques for studying calcium movements and distribution in cells. Phosphatidylinositol turnover, activation of protein kinase C by diacylglycerol and the release of calcium from intracellular stores by inositol trisphosphate, adenylate cyclase, guanine nucleotide regulatory proteins, and cyclic nucleotides as transducers and second messengers. Each topic will be introduced with a lecture that will be followed by discussion of recent papers from the literature.

[VETPR 701 Receptors and Ion Channels

Spring. 2 credits. By permission of the instructor. Lecture and discussion. R.E. Oswald (coordinator) and G.A. Weiland. Not offered 1991–92.

Topics discussed include biochemical and electrophysiological mechanisms of ligand- and voltage-modulated ion channels and the role of those channels in physiological function; disease states and drug actions on the level of the membrane, cell, and organ. This is to familiarize students with concepts, methods, and recent progress in understanding the mechanisms of neurotransmitter-drug receptors.]

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 (coordinator) and G.A. Weiland.

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

Spring, even-numbered years. 3 credits. Limited to third- and fourth-year undergraduate and graduate students. Maximum enrollment, 20 students. L.M. Nowak.

This is a basic-level course in vertebrate central nervous system pharmacology, in which mechanisms of synaptic transmitter and drug action at the membrane and cellular level are emphasized.

The relationship between particular neurotransmitters, neuroanatomical structures, normal function, and dysfunction is discussed.

VETPR 705 Molecular Mechanisms of Receptor-G Protein Coupled Signaling (Graduate)

Fall, 1991 then alternate springs. 2 credits. By arrangement. 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, phosphatidyl inositol lipid turnover, and receptor systems regulating various ion channels.

VETPR 711 The Role of Calcium in Stimulus-Secretion Coupling (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. C.M.S. Fewtrell.

VETPR 712 Eosinophil Stimulus-Secretion Coupling (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. C.M.S. Fewtrell.

VETPR 713 Mechanisms of Growth-Factor Action (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. R. A. Cerione.

[VETPR 714 Central Nervous System Neurotransmitters (Graduate)]

Fall, spring, and summer. 1-3 credits. By permission of the instructor. L.M. Nowak. Not offered 1991-92.]

VETPR 716 Neurobiology of Seizure Disorders (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. W.S. Schwark.

VETPR 717 Single-Channel Recording (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. R.E. Oswald.

VETPR 718 Structure-Function of the Nicotinic Acetylcholine Receptor (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. R.E. Oswald.

VETPR 719 Computer Modeling of Drug-Receptor Interactions (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. R.E. Oswald.

VETPR 720 Modulation of Nicotinic Acetylcholine Receptor Function by Substance P (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. G.A. Weiland.

VETPR 721 Molecular Mechanisms of Pharmacological Blockade of Voltage-dependent Calcium Channels (Graduate)

Fall, spring, and summer. 1-3 credits. By permission of the instructor. G.A. Weiland.

VETPR 723 The Role of Calcium in the Control of Electrolyte Transport (Graduate)

Fall and spring. 1-3 credits. By permission of the instructor. G.W.G. Sharp.

VETPR 724 The Control of Hormone Secretion

Fall and spring. 1-3 credits. By permission of the instructor. G.W.G. Sharp.

The following courses are **Special Topics in Pharmacology**. Fall, spring, and summer. 1 credit each topic. By permission of the instructor. Pharmacology faculty. Reading and discussions.

VETPR 741 Neuromodulation G.A. Weiland.

VETPR 742 Receptor Mechanisms G.A. Weiland.

VETPR 743 Neuropeptides G.A. Weiland.

VETPR 744 Voltage-dependent Calcium Channels G.A. Weiland.

VETPR 745 Neuropharmacology G.A. Weiland.

VETPR 746 Electrophysiological Techniques R.E. Oswald.**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 751 Receptors in the Immune System** C.M.S. Fewtrell.**VETPR 752 Mediators of Inflammation** C.M.S. Fewtrell.**VETPR 753 Clinical Pharmacology (Selective)** Fall. W.S. Schwark.

Discussion on current issues in applied therapeutics in veterinary medicine. Enrollment by permission of instructor.

VETPR 754 G Proteins in Signal Transduction R. A. Cerione.**VETPR 755 Calcium in the Control of Hormone Secretion** Fall and spring. G.W.G. Sharp.**VETPR 756 Mechanisms of Calcium Handling** Fall and spring. G.W.G. Sharp.**VETPR 757 Intestinal Electrolyte Transport** Fall and spring. G.W.G. Sharp.**VETPR 759 Receptor Binding Techniques** R.E. Oswald (coordinator) and G.A. Weiland.**VETPR 760 Advanced Topics in Pharmacology** 1–3 credits. Pharmacology faculty.**VETPR 770 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.**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. Gilmour, E.R. Loew, A. Quaroni, R.B. Silver; senior lecturer: C.H. McFadden; instructor: 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 (also Women's Studies 214) (Undergraduate)]

Fall, alternate years. 3 credits. Not offered 1991. 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.]

VETPH 313 Histology: The Biology of the Tissues (also Biological Sciences 313) (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.

45 Warren
VETPH 346 Introductory Animal Physiology (also Biological Sciences 311) (Undergraduate) MWF 11:15-12:10

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 Introductory Animal Physiology Laboratory (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.

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.

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 prob-

lems, 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 (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 1991: Four topics are offered.

Bio S 711 The Physiologic Systems That Control Ingestive Behavior: Thirst and Hunger (Graduate)

Fall. Offered alternate years. 1 credit. T.R. Houpt.

Common mammalian species are considered including the rat, dog, goat, pig, horse, and human.

Bio S 713 Thermoregulation and Exercise (Graduate)

Fall. Offered alternate years. 1 credit. D. Robertshaw.

An examination of the competing demands on the body of exercise and heat exposure with particular emphasis on the cardiopulmonary system and integration of thermoregulatory reflexes.

Bio S 715 Acid-Base Relations (also Veterinary Medicine 627) (Graduate)

Fall and spring. 2 credits. A. Dobson.

An independent study course.

Bio S 717 Proteolysis in Physiological Function and Dysfunction (also Bio S 731-736 Current Topics in Biochemistry) (Graduate)

Fall. 1 credit. Lecture/seminar to be arranged. J.F. Wootton.

Spring 1992: Three topics are offered.

Bio S 712 Plasma Lipoproteins (Graduate)

Spring. 1 credit. A. Bensadoun.

Seminar, one hour each week.

Bio S 715 Acid-Base Relations (also Veterinary Medicine 627) (Graduate)

Fall and spring. 2 credits. A. Dobson.

An independent study course.

Bio S 718 Evolution of Color Vision (Graduate)

Spring. 1 credit. E.R. Loew.

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. Not offered 1990–91.

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)

Fall, 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 (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 Physiology Methods I & II (Graduate)

Fall and spring. 2 credits each. Prerequisites: graduate student status or permission of course coordinator. Enrollment is limited. 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 research laboratories of Physiology faculty members to acquaint students with the latest techniques and methods in physiological research. Three modules are offered each semester by arrangement with the course coordinator.

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College of Veterinary Medicine Cornell University

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