Veterinary education is reviewed in the light of the essential values of veterinary functions to public health progress.

Veterinary Education and Public Health

By H. J. STAFSETH, D.V.M., Ph.D.

THE Organizing Committee Fellows of the American Board of Veterinary Public Health defined veterinary public health as ". . . all community efforts influenced by the veterinary arts and sciences applied to the prevention of disease, protection of life, and promotion of the well-being and efficiency of man."

Relation of Animal Diseases to Public Health

In the Mosaic law and in Exodus 9 : 8–10, there are rather clear indications of recognition of relationships between certain animal and human diseases. Jenner in the 18th century recognized the relationship between cowpox and smallpox. However, it was not until late in the 19th century that it was fully realized that tuberculosis in cattle and in human beings is one disease and that the same is true for anthrax and rabies in man and animals. These momentous discoveries led to the realization that research on animal diseases might help to solve problems related to human diseases and that prevention of animal diseases would also afford protection to human beings against diseases of animals communicable to man.

Dr. Stafseth is head of the department of microbiology and public health and director of the division of biological sciences and of the medical technology curriculum, Michigan State College, East Lansing, Mich.

Hull lists 115 diseases that may be transmitted from animals to man. Most of these are animal diseases (*1*). Thus, transmission of disease from animals to man is significant to the public health. Few persons living today realize the protection from communicable diseases which they enjoy as a result of veterinary medical activities throughout the world. The veterinary profession has made valuable contributions to preventive medicine in a number of ways, most of all in developing methods of control, prevention and eradication of communicable diseases, many of which are transmissible to man. Notable examples are anthrax, brucellosis, equine encephalomyelitis, foot-and-mouth disease, glanders, hookworm infestation, ornithosis, rabies, trichinosis, and tuberculosis.

Also, by means of research on milk, meat, and general food hygiene, much progress has been made in preventing the spread of disease through foods.

Some of the principles developed for the control and prevention of animal diseases have been adapted to the prevention and control of human diseases, as for example, in the detection, isolation, or elimination of vectors. The outstanding incident in this category is the discovery that Texas cattle fever is spread by a tick. This discovery helped to solve the long-prevailing mystery regarding the mode of spread of malaria and yellow fever.

Vaccination of animal hosts is another method of prevention of spread of disease from animals to man. Through veterinary medical

research, many valuable immunizing agents have been produced.

Elimination of some diseases from our animal population has been so complete that many people have never known or have forgotten that such diseases ever existed; hence, too many of our citizens are somewhat unconcerned regarding veterinary education and research. This is the more regrettable because disease is not static. New problems arise frequently and solutions to these must be sought.

History of Veterinary Education

Formal veterinary education began in France with the founding of the veterinary college at Lyons in 1761. This important event was precipitated by outbreaks of rinderpest (cattle plague), a serious epizootic disease of ruminants prevalent in Africa and Asia and repeatedly spread to Europe, especially in times of war.

Emergencies created by wars were largely responsible for the founding of a second veterinary college in France in 1764, the renowned Ecole Nationale Vétérinaire d'Alfort.

In 1773, the Royal Veterinary College in Copenhagen, Denmark, was established for the purpose of providing protection for the health of the all-important animal industries of that country. Soon after the founding of these three veterinary colleges, others were established throughout Europe and elsewhere.

Veterinary Education in North America

The first veterinary college in the United States was established in Philadelphia in 1852; the second, in Boston, in 1855, and the third, in New York, in 1857. All these failed in a short time. From 1852 to 1947, 34 veterinary colleges were established and discontinued in the United States and Canada.

The Ontario Veterinary College, affiliated with the University of Toronto, was founded in 1862 and is the first one in North America to have survived to the present.

In 1908, there were 14 private and 7 State veterinary colleges in the United States. By 1918, the number had grown to 23, all offering complete courses in veterinary medicine; 12 of these were private and 11 were State-supported and affiliated with State colleges and universities. The oldest of the State veterinary colleges in the United States was established at Ames, Iowa, in 1879 as a division of Iowa State College.

A move to raise veterinary educational standards by providing better instruction and more adequate equipment was made in 1908 by Dr. A. D. Melvin, chief of the Bureau of Animal Industry, United States Department of Agriculture, and representatives from 12 veterinary colleges. Strangely enough, the opposition to this effort came chiefly from State schools.

Effects of Higher Educational Standards

During World War I the Surgeon General of the United States Army contributed to the raising of standards of veterinary education. Up to that time veterinary education varied from 2 to 4 years of college and there were varying entrance requirements.

Thus, because of the demands of the Bureau of Animal Industry and the Medical Corps of the Army, to which the Veterinary Corps was attached, minimum standards for veterinary education were established, namely, high school graduation or its equivalent as qualification for veterinary college admission and 4 years of study in an accredited veterinary college for obtaining the D.V.M. or V.M.D. (University of Pennsylvania) degree.

Because of the elevation of educational standards, the private colleges closed during or soon after the war period. Only the 11 State-supported schools remained. During the decade from 1920 to 1930, enrollment in veterinary colleges in the United States fell to an all-time low. Since then, it has increased rapidly (see chart).

Following World War I a number of veterinarians in the United States became vitally interested in the public health aspects of veterinary medicine and, through teaching and research, contributed much to preventive medicine and public health. Among them were: William H. Feldman, Ward Giltner, William A. Hagan, I. F. Huddleson, K. F. Meyer, Nathan Sinai, and Jacob Traum.

Graduates from schools of veterinary medicine, 1930–54

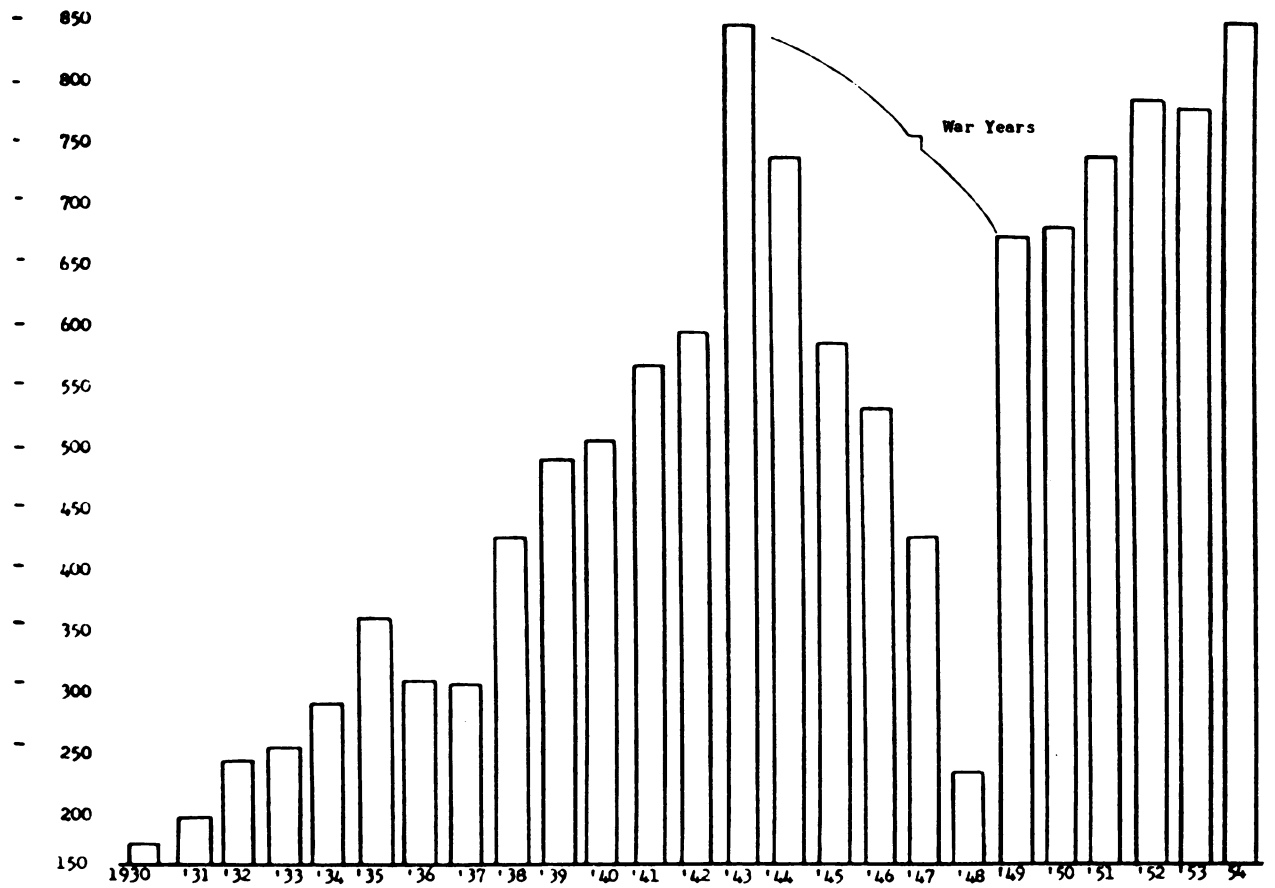

Illustration from the *Journal of the American Veterinary Medical Association*

This graph is based on the schools in the United States only. "War years" refers to the effect of World War II on the number of graduates. In 1943, two classes were graduated in 1 year due to acceleration; in 1948, because of the decrease in demand for veterinarians, only five schools had graduates.

Increased Demands for Veterinary Education

Since 1945, six new veterinary schools have been established in the United States, partly to meet the demands of returned war veterans for veterinary education and partly because of obvious need for more veterinary services. One of the fields of veterinary service which began to attract more and more veterinarians was what, for want of a better designation, is now called veterinary public health. This field has to do with the maintenance of animal health for the specific purpose of protecting the public from animal diseases transmissible to man. There are now 17 veterinary schools and colleges in the United States and 2 in Canada. These are listed, in the order in which they were founded, on page 665.

In 1954, the veterinary colleges in the United States graduated 799 students with the doctor of veterinary medicine degree (V.M.D., University of Pennsylvania). Ontario Veterinary College graduated 74. The number of graduates from the School of Veterinary Medicine, Province of Quebec (affiliated with the University of Montreal) was 18. The total number of seniors in the 19 veterinary colleges was 904 in 1954. The total enrollment in 1952 was 3,836 and in 1954, 3,883.

Entrance Requirements and Curriculums

From the time they were founded, three of the older veterinary colleges—Kansas State College, Michigan State College, and Texas

A. & M. College—have offered a 4-year professional curriculum with graduation from an accredited high school as entrance requirements. Iowa State College changed from a 3-year to a 4-year curriculum in 1903. The State College of Washington added a fourth year in 1906. During the period 1913 to 1917, all the rest of the older schools in the United States went over to 4-year curriculums. All the schools established since 1945 began with 4-year professional curriculums.

Entrance requirements have been raised from time to time. In 1931, Iowa State College added 1 year of college work, and soon the other colleges did likewise. Since 1949, all veterinary colleges in the United States have required 2 years of college work of a prescribed nature as minimum preparation for admission. A considerable number enter with the bachelor of science, master of science, or even the doctor of philosophy degree.

The United States Army and the Congress helped to elevate standards of veterinary education to their present level. Shortly after World War II, the initial rank of commissioned veterinary officers in the Army was changed from first to second lieutenant. The principal reason for this was that only 5 years of college work were required for the attainment of the D.V.M. degree. Members of the professions and the veterinary colleges reacted promptly and vigorously by adding a sixth year to the veterinary curriculum. The Congress responded by reestablishing the first lieutenancy as the initial rank for commissioned veterinary officers in the United States Army.

The Canadian colleges offer 5-year professional curriculums, with graduation from high school (5 years) or its equivalent as a minimum entrance requirement.

The nature of present-day veterinary education is shown in the curriculum on page 666, taken from the catalog of an American college.

It will be noted that much time is devoted to subjects dealing with communicable diseases, infectious and parasitic, with emphasis on preventive medicine. This undoubtedly has been instrumental in the success the veterinary profession has achieved in controlling and eradicating communicable diseases of animals. Inasmuch as veterinarians are trained to approach health problems particularly as they apply to the herd rather than to the individual, they are well prepared for work in public health.

Three of the American colleges offer little or no formal class work in the fourth professional year. All, or most, of the fourth year work is done in the clinics where the students are required to make use of what they have learned in their basic science courses, that is, they must apply bacteriology, pathology, parasitology, pharmacology, and so on, in veterinary practice under the supervision of a well-qualified

Veterinary Schools and Colleges

1862	Ontario Veterinary College, Toronto, Ont., Canada.
1879	Division of Veterinary Medicine, Iowa State College of Agriculture and Mechanic Arts.
1884	School of Veterinary Medicine, University of Pennsylvania.
1885	College of Veterinary Medicine, Ohio State University.
1894	School of Veterinary Medicine, Séminare de St. Hyacinthe, St. Hyacinthe, P. Q., Canada.
1896	New York State Veterinary College, Cornell University.
1899	College of Veterinary Medicine, State College of Washington.
1905	School of Veterinary Medicine, Kansas State College of Agriculture and Applied Science.
1907	Division of Veterinary Medicine, Colorado Agricultural and Mechanical College.
1907	School of Veterinary Medicine, Alabama Polytechnic Institute.
1909	School of Veterinary Medicine, Michigan State College.
1916	School of Veterinary Medicine, Agricultural and Mechanical College of Texas.
1945	School of Veterinary Medicine, Tuskegee Institute.
1946	School of Veterinary Medicine, University of Georgia.
1947	School of Veterinary Medicine, University of Minnesota.
1948	School of Veterinary Medicine, University of California.
1948	College of Veterinary Medicine, University of Illinois.
1948	School of Veterinary Medicine, Oklahoma Agricultural and Mechanical College.
1949	School of Veterinary Medicine, University of Missouri.

Preprofessional Curriculum

First Preveterinary Year

Fall		*Winter*		*Spring*	
Communication skills	[1] 3	Communication skills	3	Communication skills	3
Natural science	4	Natural science	4	Natural science	4
Inorganic chemistry	3	Inorganic chemistry	3	Organic chemistry	3
Elective	3	Mathematics	3–4	Trigonometry	3
Military science	1	Military science	1	Elective	3
Physical education	1	Physical education	1	Military science	1
	15		15–16	Physical education	1
					18

Second Preveterinary Year

Social science	4	Social science	4	Social science	4
Humanities	4	Humanities	4	Humanities	4
Physics	3	Physics	3	Quantitative analysis	3
Zoology	3	Zoology	3	Physics	3
Military science	1	Military science	1	Military science	1
Physical education	1	Physical education	1	Parliamentary procedures	1
	16		16	Physical education	1
					17

Professional Curriculum

First Year

Anatomy, gross and microscopic	10	Anatomy, gross and microscopic	10	Anatomy, gross and microscopic	10
Biochemistry	3	Biochemistry (animal)	3	Chemistry, blood and urine	2
Introduction to dairying	3	Farm poultry	3	Dairy herd operations	4
	16		16		16

Second Year

Livestock management	3	Animal husbandry	4	Animal pathology, systemic	5
General animal pathology	3	Animal pathology, systemic and general	3	Immunology and serology	4
General bacteriology	5	Pathogenic bacteriology	4	Poisonous plants	2
Introduction to parasitology	3	Veterinary parasitology	3	Dairy cattle nutrition	3
Veterinary physiology	4	Veterinary physiology	4	Veterinary physiology	4
	18		18		18

Third Year

Pharmacotherapeutics	5	Pharmacotherapeutics	5	Veterinary parasitology	3
Public health aspects of foods	4	Clinic	0	Chemotherapeutics	3
General surgery	3	Small animal medicine	4	Poultry diseases	4
Obstetrics	3	Large animal medicine	3	Clinic	0
Veterinary medical diagnostics	3	Obstetrics	3	Small animal medicine	4
	18	Small animal surgery	3	Large animal medicine	3
			18		17

Fourth Year

Clinic	4	Clinic	4	Public health aspects of meat and meat products	3
Large animal surgery	5	Radiology	3	Clinic	4
Infectious diseases	3	Large animal surgery	3	Infectious diseases	3
Jurisprudence and ethics	3	Infectious diseases	4	Elective [2]	6
	15	Elective	3		16
			17		

[1] Credits.
[2] Veterinary public health administration.

clinician. In the clinics they will encounter patients in the form of all sorts of livestock, including chickens, ducks, and turkeys, and also pets and wild birds and animals of a considerable variety. This is one of the several features of veterinary medicine which make it a broad and often a very difficult subject.

One veterinary college assigns students for periods of service in slaughterhouses, public health agencies, and on farms of State institutions for experience and training in veterinary public health and general veterinary practice.

The colleges that are not so fortunately situated attempt to provide similar training through field trips to such places under the direction of teachers in the respective fields. Visits to biological and pharmaceutical manufacturing plants are usually included. Some schools require, and all encourage, the students to spend at least one summer vacation with a veterinary practitioner. Others require that the students spend 3 months during the summer in the clinics of the college in lieu of experience with a private practitioner.

One college requires that students who have completed the junior year continue during the summer quarter. Thus, they will be able to complete all professional academic requirements by the end of the winter quarter of their senior year. Each student then is required to spend the spring quarter as an intern under an approved veterinary practitioner. This system may have special merit because students who have completed all their academic work will obviously be better prepared to gain more out of this practical experience than will those who have only 3 years of basic professional education.

Emphasis on social and professional responsibilities is an intrinsic and essential item in education of any sort. Veterinary students should be thoroughly indoctrinated in their various responsibilities to society. Because veterinary education has been made possible by public expense, the public demand on a veterinarian's service in any field in which he may have been trained, seems just. This applies to participation in community public health activities, as well as to any other phase of veterinary practice.

Every veterinary college should have on its staff a veterinarian with graduate training and field experience in public health. Only a person with such training and experience can interpret properly veterinary public health problems and portray adequate, public health practices to the student.

The veterinary research worker must be fully cognizant of the public health aspects of his problems, and, last but not least, the livestock regulatory official, Federal, State, or local, must always be mindful of his public health responsibilities.

What Is Next in Veterinary Education?

Veterinarians graduated from modern American colleges have received considerable education. The rapid increase in educational requirements makes one wonder what may be the next step in veterinary education. The increasing volume of scientific literature may make it seemingly necessary to lengthen college courses. But students would then spend so much time in school that little would be left for life beyond the university. The minimum total education period for a veterinarian is now 18 years. For those who have earned the B.S. degree before entering the veterinary college, it is 20 years, and for those who have taken graduate work before being admitted to the veterinary college or following graduation with the D.V.M. degree, it may be 26 to 28 or more years. No person can become a practicing veterinarian before he is 24 years old, assuming that he starts primary school at the age of 6.

For veterinarians who expect to become teachers or research workers or both, the Ph.D. degree is now almost a prerequisite. Therefore, these persons may be 28 to 30 years of age, or even older, before they can be considered to have arrived at a fully acceptable educational level. Thus, there will be relatively little time left for a professional career and for raising a family. Furthermore, the cost of such education, like the cost of medical education, has become so great that practicing veterinarians must have substantial resources, or the prospect of a substantial income, in order to enter the profession. This initial overhead has had its impact on the costs of veterinary services.

Much must be done before the best of which we are capable can be achieved in veterinary education. Our goal will not be reached by continuing to add years to the curriculum but rather by better use of the time now allotted to it. Students need a higher degree of motivation and a keener perception of the responsibilities and social implications of professional service. Careful attention to this aspect of education in the home, in the Sunday School, and in grade schools could provide a good foundation for further training in that direction in college.

Continuing Education

Continuing education is another means through which a solution to our educational problems may be sought. If professional schools can succeed in convincing professional students of the absolute necessity of lifelong study, and if adequate facilities can be established for continuous professional education, we will do better than by further lengthening undergraduate, preprofessional, and professional education.

True, we have postgraduate short courses now; but, in my opinion, they are not very effective. The professional people who need them most do not bother to attend. Also, too often the courses are conducted in much the same manner as ordinary professional conventions. The first sessions in the morning and after lunch are generally very poorly attended; laboratory work is relatively seldom included, and the only lectures and demonstrations that are usually well attended are those which provide information that will lead to immediate financial returns.

It does not seem unreasonable to suggest that certificates of active and satisfactory participation in at least one refresher course periodically, perhaps even one a year, should be required for uninterrupted license to practice. By active and satisfactory participation is meant actual attendance at lectures and laboratory sessions. Some such system of continuing education, if developed, would go a long way toward assuring continuation of effective veterinary services in the United States.

REFERENCE

(*1*) Hull, T. G.: Diseases transmitted from animals to man. Springfield, Ill., C. C. Thomas, 1941.

technical publications

National Institute of Mental Health

Public Health Service Publication No. 20. Revised 1954. 20 pages; illustrated. 15 cents.

This completely revised brochure describes the current operations of the National Institute of Mental Health—the Public Health Service agency which administers the National Mental Health Act of 1946. The booklet focuses particular attention on the broad spectrum of mental health research. It describes the institute's own clinical and laboratory investigations and outlines the policy and administration of the mental health research grants and fellowships program. Other programs described are training and standards, community services, professional services, and mental health education.

information leaflets

GOOD TEETH. *Public Health Service Publication No. 405, Health Information Series, No. 83. Revision of Supplement No. 149 to former weekly Public Health Reports. 11 pages. 10 cents.*

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