The Relation of Veterinary Research to the Practice of Veterinary Medicine

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WE LIKE to say there is only one medicine. That puts us in the same boat with practitioners and students of human medicine. I hope we don't seek to use this device to inflate the ego. To prove that there is only one medicine we should first agree on—not define—what we mean by medicine.

Medicine is not a science. Medicine is an attempt, a mechanism, or an organization which undertakes to utilize all sciences—physical, biological and social, and all arts for the purpose of the prevention and cure of diseases of man and the lower animals and for contributing to their comfort and alleviation of their sufferings. There is much that masquerades under the name of medicine that bears no relation to science, although it may be related to art—black art, necromancy or just good old American quackery. With the latter we shall have nothing to say. It is a problem for the psychologist and psychiatrist.

Clinical Report

Veterinary medicine is pregnant with difficulties since there are so many species of animals with which to deal. During the past year our clinicians report treating 11,117 animals including horses, cattle, sheep, swine, dogs, cats, rabbits, canaries, mules, foxes, goats, ducks, raccoons, monkeys, blue jays and Shetland ponies. The preceding year they included snakes, coyotes and parakeets in their repertoire. In other years the variety is maintained by drawing on other species. The reports of the pathologist show that just as great or a greater variety of species come to autopsy. Last year, there came to the pathologist in addition to those species named by the clinicians, fitches, minks, rats and guinea pigs. In addition to thousands of domestic fowl, the poultry pathologists add ducks, canaries, geese, pheasants, pigeons, turkeys and even squirrels. These are only some of the species that veterinary medicine contends with.

Human medicine has a list of the official causes of death in man.[1] To my knowledge we have not adopted such a list for animals. Perhaps it is just as well. We have reason to suspect that in human medicine there is not always a close connection between the cause of death of the patient and the cause of death on the death certificate. Thus, vital statistics are not too accurate. Our clinical department saw fit to classify their 11,117 cases under 296 different categories or diagnoses. When I attempted to enumerate the number of different pathological findings of the clinical pathologist, I gave up in despair. The poultry pathologists succeeded in packing all of their 5,374 poultry cases under 74 different headings of diagnoses. I am not boasting or setting up Michigan State College as an outstanding example of great diversity in its veterinary experiences. Certainly each of the ten veterinary colleges in the United States, and many of the state colleges and universities that maintain only a veterinary department, such as Purdue, could match my comparative pathology statistics. For that matter, so could many private practitioners. The point is that veterinary pathology is infinitely complex. Ideally and scientifically, it is the bigger part of medicine and practically

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it is a challenge to the best efforts that man is capable of putting forth.

Physician and Veterinarian

Some unkind persons have estimated that in human medicine as high as eighty per cent of the patients have nothing the matter with them. That is to say, there is no tissue pathology. Or, to put it in another way, human medicine has to deal with a great many psychopathic cases and conditions. These are rarely encountered in animals, although not infrequently encountered by the veterinarian in the owner of the animal. So, while the physician deals with only one species of animals, he deals with both tissue pathology and psycho-pathology; the veterinarian deals with no one knows how many species of animals, but he has little to do with anything but structural changes. The physician encounters many functional disorders, the veterinarian few. The physician depends perhaps too much upon subjective findings, the veterinarian works on an objective basis. The physician may have a greater incentive than the veterinarian since his work is more humanitarian and less economic. He may expect greater rewards, but probably only in exceptional cases.

Sources of Knowledge

In treatment of disease, either preventive or curative we must have information, knowledge and skill, although I must admit that treatment is constantly applied in the absence of all three. What are the ultimate sources of knowledge? They are, I take it, intuition, experience and experiment. Concerning intuition not much need be said. If intuition is "truth obtained by internal apprehension without the aid of perception or the reasoning powers", then I must confess that some of our students place too much confidence in their powers of "internal apprehension". Far be it from me to belittle the importance of intuition, women's or men's, or to throw doubt on the validity of its findings. Concerning experience, much might be said were it not for the limitations placed upon me by my topic. Experience is a great and expensive teacher. The trouble with some persons is that they are so lacking in knowledge of what to do or so tired that they don't do anything. They don't have any experiences. They don't even have experiences second-hand or vicariously. They can't or they are too tired to read or to listen to the experience of others, or they lack judgment or discrimination in their readings and listenings. One great trouble with experience is that it is a fruitful means for the perpetuation of ancient error. Doing anything wrong a thousand times or for a thousand years is not a valuable experience. Experience differs from intuition in that it does represent gross evidence of an expenditure of energy. If only the energy expenditure is wisely applied, experience is a great teacher.

Veterinary Research

Now we come to our subject: The Relation of Veterinary Research to the Practice of Veterinary Medicine. What is veterinary research? Why, it is experiment, the last of our three sources of information. One should not be too dogmatic in his classifications or make too fine distinctions. Experimentation is only a form of experience, and some of the best experimenters not only have many experiences but also depend on "hunches" or intuition. The value of the experimental method and approach is that it may hurry things up. The experimental era began no farther back than the memory of some of us, but this does not mean that no one did any experimentation before the nineteenth century. Roger Bacon, in the thirteenth century, had the idea and Francis Bacon more clearly in the sixteenth and seventeenth centuries. The serious consideration of experimental medicine began with the work of such men as Claude Bernard in physiology and Louis Pasteur (a chemist) in infectious diseases. The work of both of these men has meant just as

much to veterinary medicine as to human medicine. The same can be truly said of most of the work of medical experimentation even when its primary objectives are the welfare of man himself. It can just as truly be said that the researches by veterinarians or others, with a view to elucidating problems in animal disease, have a bearing on human medicine. The work of Smith and Kilborne with Texas fever, an insect-born disease, is the classical example. There are many other good examples.

Central Brucella Station

At Michigan State College there is a set-up known as the Central Brucella Station operating within the Department of Bacteriology and Hygiene under the direction of Dr. I. Forest Huddleson, research professor of Bacteriology. This station represents the fruition of a long period of evolutionary effort on the part of Dr. Huddleson and his associates. Today it is housed in a well-equipped laboratory in the basement of the veterinary hospital. It is a complete unit, well isolated and physically distinct from the operations of any other department. It is supported by the Michigan Agricultural Experiment Station (the support of which is derived from both state and federal appropriations), from the Bureau of Animal Industry of the U. S. Department of Agriculture, from private sources, and from earnings from the sale of products. Let it suffice to say that this institution, under Dr. Huddleson's inspiring leadership and dogged determination, has made contributions of great value to animal industry and to human health. Researches here on Brucella and brucellosis by veterinarians have made possible ready cultivations and classification of Brucella; rapid diagnosis of brucellosis by the plate agglutination method, a method which is rapidly being adapted for the diagnosis of many other diseases in animals and man; the development of a biological agent, brucellin, for the treatment of human brucellosis, available to physicians under license from the U. S. Public Health Service, and brucellergen for the skin test in humans; the demonstration of a capsule on Brucella, a discovery that should throw light on the chemistry of virulence and avirulence; the elucidation of many pertaining to immunity in brucellosis especially of cattle, and the hope that practical immunization in the field may soon be accomplished; and many other revelations. It is needless to say that the investment in the Central Brucella Station has paid rich dividends, and that its operations have brought great honor and credit to veterinary research. I am sure that a study of the activities of the Department of Veterinary Science at Purdue University would result in revealing similarly inspiring results.

Efficiency

The practice of veterinary medicine must be based on the accumulated store of knowledge of the facts of the medical sciences as they relate to our problems. To the extent that the practitioner depends upon intuition as the source of his knowledge he will tend to be a failure and a discredit to a learned profession; to the extent that he depends upon experience alone, either his own or that of others, he will progress slowly and will most surely inflict upon his patients antiquated procedures and on his clients the certain tax of inefficiency, but if he will supplement his intuition and experiential or empirical knowledge with that gained from experiment, he will at least do the best that can be done under the handicap of natural human limitations.

Within the past few years we have had a rude awakening. A great people and a great nation under great, if insane, leadership have taught us the overwhelming force of efficiency. That it had to be done in such a ruthless way, with such tragic results, and inspired by such questionable motives is beside the point. It seems that we live in a world that simply will not tolerate inefficiency. Woe be unto the backward, the laggard, all who do things in second and third

best ways, and even everyone who refuses or hesitates to use all his God-given intellect to wring from nature her innermost secrets with the purpose of promptly utilizing them in practice. Whether these efforts and their fruits will make a better world for us to live in is a question. The answer is the job of philosophy and religion. Our job is to conserve horses and hens whether they be used for the cavalry and cavalryman or for the steeple chase and church socials.

Research Progress

Veterinary research in the United States has made progress in the past few decades. It has been subsidized almost exclusively by federal and state funds. There has been a limited amount of backing from private or philanthropic individuals or corporations, and there has been some excellent work done by commercial houses, perhaps actuated by commercial motives, but of great value nevertheless. I have not had the opportunity to make a careful study of the amount of money that goes into veterinary research annually in the United States. It might be dangerous to make public the results of such a study. The non-discriminating public might conclude that the results of investment do not justify either increase or maintenance on the present level. I feel much safer in presenting to the public specific examples of veterinary research that promise big dividends on markedly augmented research investments. Never in the history of mankind has so much interest been manifested in research and the magic power of experimentation; never before has it appeared so easy to sell the idea of investment in the scientist. Whether the comparative pathologist has fully shared in the confidence placed in the experiment, I cannot say statistically. I only know that he is deserving of the confidence of the supporters of research on the basis of his achievements and the promise of continued fruitful efforts.

Research Auspices

Veterinary research in the United States is carried on under the following auspices:

1. Ten veterinary colleges.
2. Department of veterinary science or other departments (bacteriology, animal husbandry, chemistry, etc.,) in the state colleges and agricultural experiment stations, largely in states that do not support a veterinary college.
3. The U. S. Bureau of Animal Industry, both at Washington D. C., and in regional laboratories.
4. Privately endowed research institutions such as the Rockefeller Institute at Princeton, New Jersey.
5. A limited number of medical educational and research centers, such as the Mayo Foundation, at Rochester, Minnesota.
6. The U. S. Army Medical School.
7. Commercial houses engaged in the manufacture of pharmaceuticals and biologics or other products used in veterinary medicine.

Objectives

To say that our ten veterinary colleges have either attained or approached perfection with respect to any part of their programs would be gross exaggeration. Their primary objective is the training of veterinarians who shall implement the findings of experience and experiment for the benefit of animal industry and the protection of the people's health. They are doing the best they can with what they have to work with; some are doing very well, some not so well. Many of us hold to the view that collegiate instruction without the inspiration and fortification of research is a broken reed or a sterile field. Consequently, each veterinary college should develop and maintain a strong research program. This program should be worked out with great care with a view to maximum and most widely diffused results supported, of course, by limited finances. The worst enemy of experimentation is an ill-advised and poorly executed project.

The purpose of the veterinary college research should be (a) to stimulate each and every member of the staff to rise above the dead level of instruction á la psittacus—"this program comes to you by transcription"—and to vitalize and vivify his classroom program with the fire of the intelligently inquiring mind; (b) to answer the questions that baffle the practitioners in their every day routine, so that their clients will rise up and bless the veterinarian, the veterinary colleges and everything to which the term veterinary can be legitimately attached; (c) to make fundamental discoveries in comparative pathology—to push back the frontiers of medical darkness; (d) to carry our load of medical research so that human medicine will know that the army on the animal disease front can be depended on to push the enemy back.

In my uneventful career, fate seems to have kicked me up and down stairs from research to teaching to administration and back and forth from one to another. I have no regrets. No one can hope to get the world all fixed up in Sunday clothes prepared in perpetuity for nothing. The world will always be dressed in overalls ready for dirt. Each one of us can only hope to get dirty effectively or in vain. In deciding on what to do especially with reference to a research program at a veterinary school, I get a mild thrill out of the fact that I selected brucellosis — as we now call it — as a major project over thirty years ago. I lay claim only to having selected the project. I brought to Michigan from Alabama some Texas fever ticks. My boss promptly and wisely burned them up. Michigan shouldn't spend much research energy on Texas fever.

Research Programs

What about the research programs in states that do not maintain a veterinary college? There may be the suggestion that the first thing for these states to do is to establish a veterinary college and then all things shall be added unto them. Very true, all things, mostly grief, would surely be added. This is not the place to discuss the adequacy of America's teaching program. It must be clear to anyone that the money available to Indiana, Minnesota, California or New Mexico for veterinary uses cannot be put into the teaching program and the research program at one and the same time. It appears that there is wise veterinary leadership in these states, and I apprehend that under this leadership an already strong research will grow stronger. I resist the temptation to list a dozen of these states that have put to shame at least half of our veterinary colleges in so far as veterinary research is concerned. Their best service to the practitioner and, consequently, to the public, is to stay on the road they are now traveling. They should strive for more financial support through the agricultural experiment stations or independently; they should exercise extreme care in the selection of projects, hand pick their men, make use of building funds, equip laboratories with a view to furthering the project and not to impressing yokels, and keep in close touch with the professions of the state. I think many are doing these things. Many are doing a commendable thing in establishing fellowships, encouraging graduate work, and in interstate cooperation as well as intrastate building up of the profession. A state that does not support a veterinary college is doing a more commendable thing than a state that has a veterinary college and fails to support it, if it builds up a strong veterinary research establishment. Such a state can acquire, as some have acquired, international renown and local support for wisely selected and successfully executed researches.

B.A.I.

The only remarks I wish to make about my third item, the B.A.I. participation, are directed toward the thought that federal funds should not be spent in concentrating research at Washington

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or to a great extent in constructing federal laboratories, but in supporting the work of the various states. However, federal monies should not be expended wastefully in states that are hopelessly unwilling or unable to carry on veterinary research. The Bureau sponsored regional laboratories at Auburn, Alabama and at East Lansing, Michigan, will give a good account of themselves. They will do much to make veterinary research respected.

Endowed Research

A careful study of privately endowed animal disease research efforts in this country cannot fail to impress one with the idea that there is a lack of enthusiasm, even faith, in veterinarians on the part of those who control the private funds. I venture to suggest that the most effective use of private funds would be through the medium of state-supported institutions.

The role played by a few great medical centers in promoting veterinary research is notable and commendable. But, after all, are they not motivated by a desire to advance the interests of human medicine through the medium of comparative pathology? Whatever their motives, they are doing great work. More power to them.

Army Contributions

The army has made and is making worthy contributions to the mass of veterinary knowledge. It should do more. With the large enrollments in our veterinary colleges, there is reason to study the advisability of re-estalishing veterinary units in the R.O.T.C. of some of the land-grant colleges that give the veterinary degree. Research projects in military veterinary hygiene and medicine should be fostered in connection with these units. If we are to have "total preparedness" the veterinarian should not be overlooked.

Commercial houses are under no obligation to their clients to conduct research, but they owe something to their stockholders. It is true that they must prepare their products according to acceptable methods and guarantee their high qualities. They must maintain a laboratory staff to this end. They have to use judgment in determining what shall be marketed. Many of them have found it profitable to devote a percentage of their earnings to experimental work, but they are rightly dependent on the results of subsidized research for new leads and improvement in old products. Research should be conducted in an atmosphere divorced from the profit motive. Practitioners should not be at the mercy of commercial concerns for either simple laboratory tests or for much needed developments in science. It is bad enough for practitioners to depend, through necessity or otherwise, on interested parties for their veterinary education and guidance. It is not my purpose to criticize the commercialization of medical science. Veterinary pharmaceuticals, biologics, and medical and surgical appliances are good and are a blessing to the practitioner. To the extent that commercial houses have established themselves in the field of veterinary education, diagnostic service, and investigation, to that extent it may be that our veterinary colleges and departments have failed.

What good ends does research serve? I think that, first, research is for the researcher. He just won't be happy without it. For him it may be an end in itself. He may be utterly oblivious of its applications or implications. Or he may hope to make a million out of it. It is easy to justify such hopes on an ethical basis. If he makes his million, society will have made its million concurrently. Research is supposed to be a servant of the people. Its fruits are supposed to ripen within the grasp and for the nourishment of the rich and the poor, for persons in every station and walk of life so that the station of all shall be elevated and everyone's path be smoothed out.

Weakest Link

Finally, let me stress an aspect of the relation of research to the practitioner. Rarely does the researcher hide his light under a bushel. He can be accused sometimes of setting out a light that would be scorned by a lightning bug or a smoky light that could not possibly illuminate any practitioner's path, or rarely he may be an *ignis fatuus* to lead the unwary astray. In my experience, the weakest link in the chain that binds the laboratory to the practitioner is the attitude of the practitioner. Admitting that veterinary research is sketchy, that its failures and shortcomings are many, that the sources of the investigator are not always available, still the fact remains that all too frequently the practitioner doesn't avail himself of the facilities offered by the laboratory. He is prone to depend upon experience, not to say intuition, and his own narrow, improperly interpreted experience at that. If anything can be done to promote veterinary investigations, let it be done. If anything can be done to induce the practitioner to avail himself of the accumulated rich storehouse of experimental work or to demand more and more of the investigator, let that also be done.

1. List of diagnosis categories for morbidity tabulations. Pub. Health Rep. 55 p. 1561-1575, Aug., 1940. (527 categories listed).

GOITER—

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size from 0.05 to 0.14 grams for each kilogram of body weight, the average weight being 0.08 gram, which is 0.02 gram above the maximal normal.

Case Cited

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