THE PRACTICE OF MEDICINE FOR ANIMALS*

BY

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You have invited me to talk about the practice of medicine for animals and to compare it with your own. Please allow me to avoid the abstract and to talk of such living things as doctors and veterinary surgeons; how they learn the one body of knowledge, exploit the same discoveries, meet with the same problems, and use the same methods in trying to solve them.

The veterinary schools are in the Universities of London, Edinburgh, Dublin, Glasgow, Liverpool, Cambridge, and Bristol. Among the medical and veterinary students I find little if any difference in social origin, upbringing, dress, deportment, and contributions to university life. In their hobbies possibly more of the city clings to the medical and more of the country to the veterinary.

Syllabus

In 1912, when I entered the veterinary school of the University of Liverpool, medical and veterinary students together attended the courses in the basic sciences, physiology, materia medica, and general pathology. They separated for anatomy and the clinical studies; but, through the friendships forged in junior days, ways and means of sharing experience in the schools were devised. A veterinary student disguised in the short white coat would be smuggled into an operation or ward round; medicals in the long white veterinary coat did the meat-inspection tour of the abattoir, studied castrations with relish, or wallowed in the post-mortem examination of a horse. Of course, our teachers knew, and pretended they didn't.

An objective survey of the training of the senior students of the two schools would bog me in a morass of detail. The superiority of the medical training was in its clinical teaching, the art of recording the case history, diagnosis, and prognosis. The highlight of the veterinary training was animal management, a huge subject which includes the characteristics and behaviour of the domestic animals, their husbandry, breeding, housing, feeding, hygiene, transport, and marketing. It equips the veterinary student with standards against which he can compare his patients and assess the efficacy of his treatments and their economic value. I missed such training in my medical course; the teaching about man and his environment was incidental and insipid. The superb qualities of the medical training in hospital tended to condition the student to the outlook of the specialist. Despite the comparative poverty of his intramural clinical training the veterinary student knew it as equipment for general practice and supplementary to pupilage.

Veterinary students are advised to spend the vacations of their first year on farms as a preparation for pupilage. For my pupilage I entered into a written agreement with, and paid a premium to, a partnership of father and son in a mixed town and country practice. The son's house, where I boarded, included the consulting-room and dispensary. It formed one side of a paved yard, which was bounded by operating theatre, garage, smithy, kennels, coach-house, harness rooms, stables, and loose boxes. Facing the office at the entrance were three houses tenanted by the head groom, head shoeing-smith, and chauffeur. There were ten whole-time employees.

The "chief" was strict, just, generous, upright, handsome, and always immaculate. Woe to the yardman if the "chief" picked up a straw or the stub of a woodbine; little escaped

his eye. He had lovely hands, which charmed a knife or a horse. He and his horse were one, a picture of power and grace, which, as he rode to the meet, warmed the hearts of Lincoln folk. He was an external examiner in surgery, a master craftsman, and a leader.

I accompanied the "chief" on his rounds and devilled for him; sometimes, and on most night calls, I went with the junior partner or his assistant. I was expected to memorize particulars of each client, his whims and oddities, his stock and husbandry, and to avoid party politics. Morning surgery began at 8.30, by which time I had dusted the dispensary, helped with the cleaning, feeding, and dressing of the in-patients, packed the gear-bags, and eaten my breakfast. Usually we were off on the rounds by 10.30; the transport consisted of two cars, a motor-bike, and a stable of horses for riding and driving. The night staff came on duty at 8 p.m., by which time I was usually washed and changed for dinner. After dinner on one evening a week stock medicines were put up and stored; farmers ordered them in lots of a dozen for home-doctoring. The system is natural, and fortunately prevails in many practices; the veterinary surgeon knows what his client has already administered and the client takes the credit for all recoveries; *noblesse oblige* goes a long way in the country. On another evening each week the accountant attended to enter up the ledger, while the professional staff deciphered entries in the day-book, costed their journeys, and checked up records of work done for Government, local authorities, and insurance companies.

There was no "clocking on and off"; I do not think it had been invented. There were occasions for leisure and recreation; I had my fill of riding and cricket, and my Sundays, after 10, were my own except for emergencies. The "chief" arranged for me to visit neighbouring veterinary surgeons when they had a particular technique or case to demonstrate; also, as a guest, I attended meetings of the local division. In all I spent 24 crowded, healthy, and happy weeks as a pupil in the practice, and I returned to it as assistant for some of the vacations of my medical course.

From my enthusiasm for pupilage I would not have you infer that it is invariably a success for student or principal. A few students do not seem to have the temperament to enjoy or profit by it. I think the need for improving the medical training for general practice would be met by re-introducing pupilage during the vacations. It would avoid any major upset in the existing system of hospital training, which in some respects is of superb quality.

Surgery

The differentiation of the medical general practitioner from the specialist does not obtain in the veterinary profession. Some veterinary surgeons restrict their practice to a particular animal; others develop a special aptitude, for which they are consulted by their colleagues. The majority of veterinary surgeons undertake major surgery at the patient's home or in their own theatres. Except for emergencies many veterinary surgeons reserve one or more periods of the week for their operations. Usually they have a nurse-secretary to maintain anaesthesia, attend to instruments and apparatus, and dress and nurse patients. All parts of the small animals, except the central nervous system, are explored by the knife.

Major surgery on the large animals is usually done in the open, sometimes at a distance from tap-water and other hygienic conveniences. The physical means for preparing and controlling large animals, during and after operations, have to be carefully planned. Nowadays veterinary surgeons have the additional difficulty of finding competent assistance on farms. For major operations on the viscera there is a preference for the large animal to stand at its manger under local analgesia. Casting the patient on a bed of straw for general anaesthesia, even when skilfully done, severely upsets the animal and influences its after-treatment and behaviour. The less the interference with the

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patient's posture and surroundings the better the prognosis. Another limiting factor of major surgery of the large animals is the size of their organs and the difficulty of bringing some of them into the incision through the body wall. Nevertheless, capacious viscera have their advantages: with his arm in the rectum a veterinary surgeon can explore the organs as far forwards as the kidneys.

The structure, functions, and diseases of the foot occupy an important place in the veterinary curriculum. It is the seat of many troubles, to which, in the horse, must be added the many injuries from faulty shoeing and work. Veterinary students receive practical instruction in the smithy. In my medical course instruction about footwear and the everyday troubles of the foot was insignificant.

For measuring a patient's fitness both professions employ similar manual, instrumental, and athletic procedures. When all these have been done for a horse the veterinary surgeon mounts and puts it through its movements and speeds. Riding with skill and judgment, he comes to his diagnosis and something more. In the exhilaration of their rhythmical movements there is evoked a mutual sympathy, which calms the apprehensive animal. I believe this sympathy uniting two creatures to be the essence of "clinical touch." Without it the doctor or veterinary surgeon, for all his knowledge, is a mere technician.

Obstetrics

The pathology of reproduction is a major subject of veterinary practice which adheres to orthodox principles and is admirably set out in the textbooks. It is governed by economics. Livestock owners at subsistence level rarely can afford veterinary obstetrical practice; they make do with primitive methods and ideas. Knowing his hill and his sheep, the shepherd can forecast where and when each ewe will drop her lambs. If a ewe is unable to lamb he does his best to deliver her. If he fails he opens his knife, cuts her throat, opens her abdomen, removes the lambs, clears their nostrils, and fosters them on to ewes with single lambs. Most of the ills of fertility, pregnancy, parturition, and infancy of animals are primarily due to infectious disease. But the voice of Pasteur rarely penetrates to those who look on lambing as the harvesting of a crop and their bread for a twelvemonth.

For three lambing seasons I was working in the Pennine Hills. One bitter night a hill farmer fetched me to his mare. I followed him over the bosom of the hill to a stable, a lamp, the mare, and three chaps fatigued by midwifery. I stripped to the waist, lathered my right arm with soap, corrected the presentation, and the mare delivered her first foal. When I turned to wash in the bucket the farmer said, "Don't waish th'onds lad, cum to th'ole wumon; she's took bad." But I washed and put on my shirt. Next door I had a look at the farmer's wife, sat on her bed, and spoke reassuringly while she gave birth to her third girl. The farmer's diagnosis was shrewd; his wife was a multipara and could wait on nature; the mare's foal was her first and nature was stuck. As for his ideas of hygiene: if hands are mucked in lambing they are wiped on the fleece and you get on with the next job.

Infectious Disease

This is the major problem of veterinary practice. It accounts for more illness than that due to autonomous, physical, and chemical causes. Domestic animals live at risk of infection from diseased contacts, insanitary surroundings, infected food, and diseased wild creatures. They live with their dung, droplets, and discharges, which, as the means of spreading infection, become more potent with crowding.

The notifiable infections, which include rabies, glanders, and anthrax, are specified in the Diseases of Animals Acts and Orders. On detection and report to the authorities they are dealt with by the veterinary officers of the Ministry of Agriculture. Of more concern to general practice are the

endemic infections, such as helminthiasis, coccidiosis, tuberculosis, Johne's disease, brucellosis, and streptococcal infection.

The parasite of the ubiquitous intestinal infection coccidiosis is expelled in the patient's dung. It can survive outside the animal for 18 months. In young animals the infection tends to an acute course with a high mortality; in adults it is a common cause of invalidity. Coccidiosis is curable, but, relative to the market value of the animal, the treatment is costly in drugs, labour, and time.

Infection by the haemolytic streptococcus is also very prevalent in domestic animals. Its foetal and infant mortality and adult morbidity rates are high. When penicillin and sulphonamides can reach it, as in septicaemia, they slay it. But the spread of the haemolytic streptococcus is by droplets, and its natural habitat is mucous membrane, particularly that of the pharynx. Under the protective coating of mucus it is relatively quiescent for a period, and then it has a burst of activity, during which it produces a toxæmia. Also from mucous membrane it may emigrate to sites of stress, such as the pregnant uterus, the mammary gland of the milking cow, or the strained capsule of a horse's joint.

From what I have said of endemic infection I would not have you infer that usually the animal patient is suffering from only the one species of parasite. In the large majority of my cases more than one specific infection was found: three specific infections were found in about 10% and four or more in about 3%. The symptomatology of polyinfection may be far removed from the sum of the signs expressed by each specific infection. Animals infected by the haemolytic streptococcus and suffering from coccidiosis show spasmophilia, which varies from the intermittent spasms of a single muscle in the mild case to the tetany, hysteria, or epilepsy of the more severe case.

Prophylaxis

In my experience the incidence of endemic infection has been increasing during the past 25 years. I see no signs of the reverse trend. This is a disappointing contrast to the impressive advances in diagnosis and specific biological and chemical treatments. Moreover, the meaning and value of these advances have been made known to stock-owners by their veterinary surgeons through the advisory schemes of the British Veterinary Association and Ministry of Agriculture. The technical means for subduing endemic infection are available, but it is not being subdued. Why?

The responsibility for seeking and accepting veterinary advice rests on the stock-owner, who tends to refrain from anticipating disease, and, after it has come, to set a greater value on curative treatment and prognosis than on specific diagnosis and prophylaxis. This attitude is encouraged by the fact that animals suffering from endemic infection are convertible into the nation's meat ration. The practices of the stock-owner are a contributory but not the essential cause of the rising incidence of endemic infection. To illustrate this I will cite one of my experiences. The story began with two sows on a farm and a public demand for pork. The two were multiplied to two dozen sows, which bred litters averaging nine. The farmer increased his pig population beyond his resources for clean husbandry. Parasites multiplied and increased the mortality and morbidity rates. The demand for pork declined and increased the farmer's losses. The story ended in the fifth year with two sows on the farm.

Wherever animals are assembled together in farm, field, market, showground, ship, and hospital, their parasites appear. They appear with the undetected infected animal. They spread in its dung, discharges, and droplets. This is no new knowledge. It and the essential preventive methods were systematized during the second half of the nineteenth century and incorporated in the veterinary curriculum as the hygiene of animal management. Fifty years ago the veterinary profession was advocating routine cleanliness as an effective control of such endemics as tuberculosis and Johne's disease; it does so to-day. Forty years ago I began

my pupillage in a practice of which the animals, equipment, and buildings were kept as clean as a new pin. To keep them clean was a veterinary surgeon's duty, pleasure, and pride. It was so even 20 years ago with many city veterinary surgeons, who maintained large establishments for the in-treatment of small animals. To-day the maintenance of an animal hospital is beyond the means of private practice. The routine cleanliness of animals and their surroundings to be effective demands intelligence, ceaseless vigilance, and trained labour.

Faced with the difficulty of obtaining the trained labour, and its high cost, the veterinary surgeon has dispensed with his animal hospital. The farmer, faced with the same economic problem, has to keep his animals, saturate them in antibiotics, and trust to luck. To-day all of us are haunted and frustrated by the same ghost. Few of us can afford to keep our homes as clean as we did. I do not see medical hospitals so well scrubbed as in my student days. Cleanliness is too expensive, and its practice fades as the welfare State slides into slumdom.

My selection of vignettes of veterinary medicine must end here. It has been a great privilege to show them on behalf of my friends in general practice. Instead of presenting their thoughts and experiences I seem to have given you far too many of my own. My only defence is to acknowledge them as my own, the best I have to give you.

ELECTRONICS AND MEDICINE

[BY A SPECIAL CORRESPONDENT]

The eighth annual exhibition of the Institution of Electronics, organized by the North-west Branch, was held at the College of Technology, Manchester, from July 15 to 21. It was opened by Sir Geoffrey Jefferson, F.R.S., emeritus professor of neurosurgery at Manchester University. The exhibition was organized in two sections: a Scientific and Industrial Research Section, in which the applications of electronics to medicine featured prominently; and a Commercial Section displaying the astonishing versatility of this infant science in solving the problems of modern industry.

The Christie Hospital and Holt Radium Institute, Manchester, demonstrated the precautions necessary in handling radioactive isotopes, and also the uses of I^{131} in estimating thyroid function, P^{32} in treating chronic leukaemia and polycythaemia and in locating brain tumours, and of radio-cobalt in irradiating neoplasms. The Department of Medical Physics, Leeds University, showed an arrangement for taking dynamic measurements of blood pressure, using a blood-pressure manometer and commercial capacitance meter which is easily constructed and apparently trouble-free. Other exhibits by this department included an electromyograph and an experimental scintillation counter in which the difficulty of distinguishing signal and noise impulses has been overcome. The Lewisham Hospital exhibit showed how x-ray films can be automatically named and numbered, and also an apparatus for recording foetal heart sounds audibly by loudspeaker and visually on both cathode screen and tube. This instrument has already been in use for about 18 months for research purposes.

The Postgraduate Medical School, London, exhibited a number of interesting devices including a trigger mechanism for taking x-ray exposures of the heart when studying the relationship of cardiac volume to the E.C.G. cycle; an exposure meter for low light levels, as, for example, in photomicrography; and an amplifier for recording uterine contractions and cervical dilatation. The mechanical heart-lung machine recently described by Melrose and Aird in the *British Medical Journal* (July 11, p. 57) was also on view: it is an impressive example of what can be achieved by combining the skills of medicine, engineering, and electronics.

The Department of Physics, Royal Cancer Hospital, London, had a very fine piece of machinery for recording

visually on a large television screen the distribution of ionizing radiation. But the exhibit of the Radiochemical Centre, Amersham, was disappointingly limited to a high β source emitter. No attempt had been made to show the work of the Centre in supplying radioactive isotopes for medical use; even a request for a catalogue of the preparations available met with the reply that the catalogues had all been taken up at a recent Continental exhibition.

The Commercial Section of the exhibition introduced one to a Jules Verne world of streamlined grey boxes and flickering eyes which appeared to be capable of telling one everything about everything, from counting the various emissions of radioactive isotopes to telling how thick one's cigarette paper is, from determining the quality of a turbine blade in a jet engine to measuring the amount of haemoglobin in the blood. A handy table-model electron microscope will photograph bacteria at $\times 60,000$ magnification, or one can sit back in a chair at the console model of the flying-spot microscope while pathology slides are projected on to a television screen for leisurely consideration.

Preparations and Appliances

COMFORT IN CALLIPERS

Dr. H. L. ROGERSON, of Bergh Apton, Norfolk, writes: A few years ago I complained in the correspondence columns of the *Journal* (1948, 2, 724) of the antiquated design of the walking-calliper. Recently, seeing that no advance had apparently been made, I thought that, as a patient and doctor with some enthusiasm for mechanical devices, I was myself in a fair position to design and have made a walking-calliper for my own use. This I did, and for 18 months have worn the resulting product in complete comfort.

My poliomyelitis is of eight years' duration, my right leg being completely paralysed up to and including the muscles around the hip-joint. The left leg is paretic to the extent of about 50%, but no calliper has been needed for this leg.

I had two main objectives, lightness in weight and as near perfect fitting as possible. A paralysed leg, even without any attachment, feels heavy and cumbersome. Lightness has been achieved partly by simplicity in design as well as by the use of duralumin, and the total weight of the instrument is 3 lb. (1.36 kg.). A high standard of fitting has been obtained by wearing the instrument in its skeleton form at first, and returning it to the makers for adjustments until considered perfect. In my case it was returned three times in the rough state before the final finishing process.

The basis of the design is the use of one "iron" only. This, in my case, for a weight of less than 140 lb. (63.5 kg.), is of duralumin strip $\frac{3}{4}$ in. (1.9 cm.) wide by $\frac{1}{4}$ in. (0.6 cm.) thick. The following are the details of construction, starting at the proximal end of the instrument.

The pelvic band is of the usual type, but without the usual metal stiffening. This stiffening is most uncomfortable for the thin patient and quite unnecessary, except as a mounting for the band in the form of a strip about 6 in. (15 cm.) long, shaped to fit comfortably below the iliac crest on the affected side. The band mounting is attached and hinged in the usual manner, so that the hinge is just clear of the skin over the greater trochanter of the femur. It is important that the portion above the hinge be moulded inwards so as to fit accurately, with its upper edge passing just inferior to the anterior superior spine of the ilium.

The leather thigh casing of usual design is laced in my original instrument, but the straps shown in my duplicate instrument are equally satisfactory.

The knee hinge is self-locking in extension and can be unlocked either directly at the knee or indirectly by means of the extension, which can be reached by a hand in the trousers pocket. The locking assembly is spring-loaded.