the harmlessness of the intra-tracheal injection of even large quantities of bland liquids, was made by Gohier of the Lyons Veterinary College (1816). Gohier accidentally observed that the introduction of half a stable bucketful of water into the trachea of a horse by some of his pupils, with the object of killing the animal, had no injurious effect; and this observation stimulated him in the following year to carry out a number of experiments, which led him to believe that it might be possible to cure or check certain chronic lung diseases of animals by injecting medicinal substances into the air passages. Notwithstanding these experiments of Gohier's, and later observations to the same effect by Delafond, Goodwin, Mayer, Perosino, and others, intra-tracheal injection did not become a recognised method of administering medicines; and it is only within the last ten years, and mainly owing to the recommendation of Professor Levi of Pisa, that the method has been brought into general practice.

Dr Schneidemühl describes minutely the method of performing the operation, and the kind of fluids that may be thus administered, and then discusses exhaustively the different diseases that have within recent years been treated by intra-tracheal injection. The advantages of the method are summed up in the following conclusions:—

1. The method is easy to carry out and devoid of danger.
2. The action of the medicinal substances thus administered follows quickly and certainly, and without any disturbance of the general condition of the patient, provided that the injected fluid contains no specifically irritant substance.
3. The dose of the substances administered does not require to be large, and time and money are saved.
4. Viscid fluids are most appropriate for injection.
5. Not only different parts of the larynx, pharynx, and trachea, but also, in small animals, the lungs (by appropriate change of position), may be thus exposed to the direct action of medicinal substances.
6. In cases where rectal or subcutaneous administration is impossible, or where too large quantities of medicine or too much time for their action is required, and whenever a certain and rapid curative effect has to be produced, tracheal injection is the best method of administering medicines, provided that they exert no directly injurious effect on the trachea and lungs.

Bacteria and their Products. By German Sims Woodhead, M.D. (Edin.) London: Walter Scott, 1891.

In this work the object of the author has been to give an account of the main facts in bacteriology and of the life-history of bacteria and closely allied organisms, and to discuss the more important theories as to the part played by them in nature's economy, especially in their relation to the commoner fermentative, putrefactive, and disease processes. The two introductory chapters are devoted to a consideration of the general morphology, physiology, and classification of bacteria, and then follows an interesting chapter on the history of bacteriology. The remainder of the body of the work is mainly taken up with a description of those micro-organisms that are the cause of the best known and most important forms of fermentation, and of the weightier of the pathogenic bacteria of man and animals, but it also contains special chapters on hydrophobia, the bacteria of the mouth, the bacteria of colour and phosphorescence, poisonous alkaloids and albuminoids, vaccination, and bacteria in air, earth and water. An appendix of 40 pages treats of the methods of practical bacteriology, and contains a condensed description of

the more interesting micro-organisms—saprophytic and pathogenic—not fully dealt with in the body of the book.

In the English language we have already a considerable number of original works or translations dealing with bacteriology, but the present treatise is in several respects a valuable addition to the works of this class. Dr Woodhead has been careful not to weary or repel his readers by tiresome description of dry details at the very outset of the book; many such details, although a knowledge of them may be strictly necessary on the part of anyone intending to devote himself to bacteriological work, are as dry as dust, and as unintelligible as Sanscrit, to the medical or veterinary practitioner who has no ambition to distinguish himself in the line of bacteriological research, but who laudably desires to possess whatever information bacteriology has brought to light that will further arm him for his daily struggle with disease. To readers of this class the book may be heartily commended as the best for their purpose yet published. In it veterinary surgeons especially will find a mass of valuable information culled from recent bacteriological researches, and presented here in the most attractive form.

In the chapter on tuberculosis the alleged danger of the milk and flesh of tuberculous animals is very fully discussed, and in that and the other chapters dealing with animal diseases the author displays a practical acquaintance with the subject that is rare in books by medical writers. As an illustration we may quote the rules which are laid down regarding the examination of dairy cows with a view to the early detection of tuberculosis :—

"(*a*) First of all the sub-maxillary glands are examined; these are easily felt, and any change is readily made out.

"(*b*) The glands at the root of the neck and those in front of the haunch bones are always carefully examined. The glands in the flank should be equal in size, about the size of the middle finger, and not hard. Mere enlargement, even when considerable, is, however, not looked upon as of great importance if it is perfectly equal on the two sides.

"(*c*) The animal is made to cough by means of pressure on the trachea, and the lungs are carefully examined during and after the coughing.

"The condition of the skin over the flanks is carefully observed; it should, in a healthy animal, be "loose," like that of a dog, soft and pliable; any adhesion, hardness, or harshness, should be carefully noted.

"(*d*) The udder is carefully examined for inequality of size and for any induration. It is a somewhat curious fact that tuberculous disease usually affects the hind quarters of the udder, which become hard and knotty, but not painful; whilst in acute inflammation of the udder, the anterior quarters are quite as much affected as the posterior; the pain is usually very acute, and the process is accompanied by much more marked febrile symptoms.

"(*e*) Then the glands above the udder, high up between the quarters, are most carefully examined. In cases of tubercular disease of the udder these glands are invariably affected, are unequal in size, and the larger one corresponding to the affected quarter, is usually considerably indurated.

"(*f*) Careful auscultation is carried out at least once a month. The forefoot of the side that is being examined being always well advanced. The normal expiration sound lasts half as long as the normal inspiration, and if this rhythm is deviated from in any way, a further and thorough examination of the lungs should always be made.

"(*g*) The examination is continued still further if the slightest suspicion of tubercular disease is aroused by the above investigation, and an examination per rectum is made, with the object of determining whether there is any tubercle of the peritoneum or not. As the onset of the disease in the udder is so rapid, and as, as yet, it is held by most observers that the bacilli may

make their appearance in the milk, even where the udder is not directly affected, it follows that if there is the slightest suspicion of the existence of tubercular disease in a cow, the milk from that animal should not be put into the milk supply."

The chapters on tetanus, actinomycosis, glanders, and anthrax are full of interest to veterinary surgeons. Tetanus is regarded as a disease caused by inoculation with an organism that has an almost ubiquitous distribution in the soil; "a horse which in the stable and in the field always collects a certain quantity of earth on his skin and in his hoofs may be easily inoculated; he in turn may readily inoculate a man or another animal by a kick with the sharp iron of his dirty shoe." As will be gathered from this quotation the author does not adopt the absurd theory put forward by M. Verneuil, that tetanus is *par excellence* a disease of the horse, and that cases of human tetanus have generally an equine origin. It might be urged in opposition to the above quotation that although human beings frequently receive bruises and broken bones as the result of horses' kicks, it is very rarely that such injuries are inflicted on exposed parts, such as would permit inoculation with dirt from the shoe.

The appendix, as already indicated, contains a *résumé* of the simpler steps of bacteriological investigation, such as the preparation and inoculation of culture media, the staining of micro-organisms, etc. This part of the work, it is expressly stated, is intended only for beginners, and it may be questioned whether its omission would have detracted much from the value of the whole. The prescription for staining the flagella on bacilli after the manner of Loeffler gives the formula for the mordant only, and omits the stain proper.

The work is illustrated by 20 figures, of which it is not possible to speak highly; in fact, it may almost be said that they disfigure the text without elucidating it. These figures are described as photo-micrographs, but in reality they are coarse mechanical reproductions of photographs. It may be noted also that the illustration showing tetanus bacilli—otherwise one of the best—shows the rods twice as broad as tubercle bacilli figured in another illustration, although the magnification is said to have been the same. This is obviously an error, as the bacilli of tetanus are rather more slender than those of tubercle. It is to be hoped that when the book reaches a second edition an attempt will be made to illustrate it by figures more in keeping with the character of the text. In passing this criticism it is perhaps only fair to state that the book is sold at the exceedingly low price of 3s. 6d.; but it would be much better to furnish better illustrations, even although that should add to the selling price of the book.

Annual of the Universal Medical Sciences. A yearly Report of the Progress of the General Sanitary Sciences throughout the world. Edited by Charles E. Sajous, M.D. and seventy Associate Editors. F. A. Davis, Publisher, Philadelphia, New York, Chicago, Atlanta, and London, 1891.

THIS colossal publication has now reached its fourth annual issue. The present series of volumes, even when regarded from the outside, strikes one afresh with astonishment at the magnitude of the undertaking, and a glance through it intensifies this feeling, and compels the admission that the United States is undeniably the land of big things. The object of the work, it may be explained, is to gather into each series every addition to medical knowledge made throughout the world during the previous twelve months. This Herculean task is undertaken by a staff comprising, besides the editor-in-