

## THE BENEFITS OF SHEEP DIPPING.

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DURING some twelve months' laboratory work in India, the enormous amount and serious nature of external parasitic disease amongst cattle and sheep have been very forcibly thrust upon me. I propose to give a short account of these affections as I have seen them, not from a professional and scientific point of view, which would be out of place in a journal of this nature, but from an industrial aspect in their relationship to agriculture.

I have found in the specimens of wool from sheep examined by me almost every known parasite that affects the skin of this animal. The commonest are, of course, the many varieties of ticks. There is the common red tick of the family *Ixodidae*, its species being found in dogs, horses, cattle and other animals. It is characterised by its colour, the presence of a scutum (that is a small hard shell of a darker red colour, present on the superior and anterior surface), and its habit of remaining upon the one host from its larval stage until its full maturity, when it falls off to lay its eggs. It is a species of this tick (*Boophilus Australis*), which is most common in this country and which is the intermediary host of the disease known as Tick Fever, Texas Fever, or Red Water. This disease is indigenous in India, and is constantly demonstrated in the blood in the form of piroplasma, *i.e.*, a protozoon organism which attacks and enters the red corpuscles, either in the small variety first noticed by Lingard and called the *Piroplasma Tropica*, or in the ordinary form of *Piroplasma Bigeminum*, first noticed in this country by Raymond.

Another variety of tick, which has, I believe, not been before recognized in this country, is one of the species of *Argasidae* of the family *Ixodidae*, which is characterised by the absence of the scutum already described. They appear at first sight to be more like a wood louse in size and habit of movement, are grey in colour, and do not live permanently on the one host, *i.e.*, they will fall off and hide in a crevice of a wall and attack another

animal the next day or night. They are more nearly associated with fowls, and are the intermediary hosts of a disease of these birds known as *Spirillosis*. Theiller, in South Africa, has recently shown that they also convey a spirillum which affects cattle. The spirillum is an organism having powers of movement, which gains entrance to the blood-stream, but not into the corpuscular elements, causing fever, anæmia and death. It is a tick of this class which is associated with the disease known in the Punjab as *Chichevi ke bimari*, now being investigated at the Lahore Veterinary College. The variety and number of species of ticks of both the above big orders are very great, much investigation being required before we can expect to know and identify all of them. In view, however, of their great importance in the transmission of disease, this knowledge is absolutely essential.

Another common affection of the sheep is the presence of lice, the species found by me being *Hematopinus* and *Trichodialis* of the family *Pediculæ*. I have seen sheep literally covered with these parasites, and it is said by the natives that they cause death. From some of the cases that I have examined, this would seem to be quite possible, the wool and hides being so packed with lice that the irritation of their presence and the amount of blood sucked by them from their host would be sufficient to induce this result. The natives call this disease *Jucee*, signifying lice. It is supposed to induce diarrhœa and death, but I have found that the cause of death is *Coccidiosis* or *Psorospermosis* which is an altogether different disease, although it is not known but what lice may have something to do with the infection as an intermediary host.

Ringworm seems to be more or less common also. The Superintendent, Civil Veterinary Department, Punjab, lately sent me some wool from an outbreak of what was supposed to be sheep scab, which was entirely ringworm of the *Tricophyton tonsurans* variety, almost every hair being affected. This is an affection, requiring much trouble to eradicate, and the loss is very considerable both in the lives of the sheep, and in the condition of the mutton and the fleece.

Finally there is ordinary sheep scab, due to the *Acarus* of that disease, (*Sarcoptes scabiei oris*), which is also more than ordinarily common in sheep, and a similar condition prevails in Buffaloes. It is looked upon by the native owner as an act of God for which there is no remedy. Imagine this condition in England or in any country where the raising of stock is conducted on modern principles.

I have given the above instances of disease in order to show the necessity for the recommendation which I wish to make for the introduction of the practice of sheep-dipping. It is a curious fact that the market prices of

most agricultural products of India are invariably lower than those of any other country. The prices of hides and wool are very poor as compared with Australia and America, and this seems mainly due to the careless condition of production in this country. The wool sent out is invariably the dirtiest in the market, the hides are badly saved, tick-eaten and inferior. All this is due to the indifference manifested in their preparation. As far as I can gather such a thing as a sheep dip has never been heard of, the ordinary precaution of having sheep dipped before the wool "clip" not even being thought of. This may possibly be due to the apathy which is characteristic of the country, but the want of any standard of excellence as an example has also a great deal to do with it. The reasons why India is not a much better stock raising country should be carefully considered. In comparison with other stock raising countries, the climatic conditions are not greatly worse in India. I have grilled in a tin-roofed hut in Queensland where it was necessary to allow 10—12 acres for each bullock and 6—8 acres for each sheep. Years ago I was stock riding in a similar country in the U. S. A., *viz.*, Arizona, where the summer heat is as trying as India, and feed is at times as scarce. But still these places are capable of producing meat, hides and wool of the first quality. A great deal of this inferiority of Indian products is due to the parasitic affections which are so exceedingly common amongst sheep, cattle and buffaloes. It is easy to imagine what deleterious effects the presence of these skin affections has not only upon the hides and wool, but also upon the animals themselves. The irritation set up inhibits the possibility of good condition, and the blood sucked is a serious debilitating loss, rendering the animal the more liable to attack by any contagious disease that may be prevalent at the time, especially as each bite of a parasitic insect causes a wound through which pathogenic organisms may gain admission.

There may be other factors which militate against a successful stock raising industry, such as the curtailment of grazing areas by the increase of cultivation. Such questions have been raised from time to time, but do not concern the point to which I wish now to draw attention. In fact, cultivation may have a beneficial effect on stock raising ; in the Argentine, huge tracts of alfalfa (lucerne) are put down for the grazing on most of the cattle and sheep runs, and in New Zealand artificial grazing of the very best quality has been introduced into the previously barren volcanic country by the sowing of clover.

As a means of reducing the ill effects of the above-mentioned parasitic affections, a system of clipping and regular dipping would appear to be indicated, whereby the external parasite would be removed, and some

of the diseases which they convey would be lessened. If only a few sheep were saved to each breeder in each year, an enormous surplus of stock would be gained, sufficient to provide all the Army Rations and other varieties of tinned mutton that are so extensively used in this country, not to mention the benefit accruing to the wool clip. This again suggests the possibility of establishing canning factories, and the increased trade which the industry would induce.

Indian stock raisers are not as a rule big owners ; they each possess comparatively few animals which all receive almost individual attention, being watched while grazing and under care at night. This would facilitate the introduction of a system of regular clipping and dipping. It would be easier to have animals clipped and dipped than is the case in the huge herds of eighty to a hundred thousand animals, as they exist in the Colonies and the Argentine ; and yet in these latter countries the thing is done without difficulty, although labour is at a very high premium. The practical application would not be difficult ; a dipping place could be arranged for amongst every two or more villages, where dipping could be carried out under trained supervision at regular intervals, as indicated and advised by Veterinary Superintendents. If necessary, a small fee might be charged to the owners in order to cover the expenses of the dip used, but for each individual sheep this would be infinitesimal, and would be paid for many times over from the benefits received. The inauguration of such a system would require the institution of some practical authority on the lines of the Stock Departments in Australia, or the Bureau of Animal Industry in the United States of America or the Agricultural Department in South Africa. A number of practical travelling Superintendents with expert veterinary knowledge would be required who could get quickly from place to place and see in what way the bad conditions which I have indicated could be ameliorated.

The chemical constituents used in the making of sheep dips and the method of mixing them in their proper proportions are hardly questions for this paper, but a system of dipping being now a recognized institution in most civilized countries, no difficulty would be experienced in obtaining full particulars as to the methods and their practical adaptation.

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