

type with sufficient prepotency to make the sires useful for purposes of grading up common stock. However, there is plenty of time, and if the experiment promises to attain a measurable degree of success in twenty-five or fifty years, it is well worth trying, for there is no question but that the ideal which the American breed-makers have in mind is a good one.

All except the color. That is a pure fad, and fads are always unfortunate. Why? Because they limit unnecessarily and inconveniently the field from which foundation stock may be selected and are certain to necessitate the discarding of many high-class individuals among the progeny, especially among the first few generations, before the color is well established. If our American friends were to ignore color, and seek conformation, scale and wearing quality, they would succeed much sooner and better in producing a popular American draft horse.

It is not that we have any prejudice against gray as a color, for it is, to our mind, one of the most attractive in a young horse, although tending to become ugly with age, and often a nuisance in the busy farm stable, where there is not enough time to wash manure stains off the work horses before starting out in the morning. For these reasons, the breeding geniuses might well have selected a more popular color, if they had to fix any color at all. Much better would it be to ignore color entirely, thus freeing themselves from the handicap of being obliged to seek merit only within the narrow and arbitrary bounds of someone's fad color.

LIVE STOCK.

PRINCIPLE OF MUSLIN VENTILATION NOT UNDERSTOOD.

Editor "The Farmer's Advocate":

Since you were good enough to send me the copy of the Sept. 19th number of "The Farmer's Advocate," containing Mr. Santee's comments regarding my failure to comprehend the first principles of muslin ventilation, I have been much of the time away from home.

The long, cold nights, and longer and more severe winters, makes the matter of ample stable ventilation of even greater importance to your countrymen than it is to farmers here. I have unlimited patience with those who do not understand, and charity for those who think my "obtuseness altogether surprising," if only there is shown a desire to know the truth. Let us, you and your readers, reason together, avoiding theory, and using only facts with which we are all well acquainted.

For wood to burn well in a stove, and not render the air of the room intolerable, a strong draft of air must continually pass through the stove and out through the chimney; and, no matter how closely the kitchen may be closed, the outgoing current of air must be supplied from some source, and is. Does this air enter by the process of diffusion through the walls, as Mr. Santee thinks it does through muslin screens, when these are used for ventilation? You well know that the stove draws much stronger on a windy day. Is it because diffusion is stronger when the wind blows, or is it simply because the air is forced bodily in through any and every opening which is not wind-proof? A house shut up for six weeks, no matter how tightly, has accumulated an astonishing amount of dust in every room and on every thing. Did this dust get in by diffusion? Or, did it blow in with the wind? Or, do evil spirits always amuse themselves by kicking up a dust in vacant houses? Are you not continually tugging at your ribs and your diaphragm, pulling one up and the other down, laboring, like a blacksmith at his bellows, trying to get enough air? Why don't you quit that foolishness and tie 2 cents' worth of muslin over your head and let the air diffuse down and up your windpipe? For the simple reason the process of diffusion is infinitely too slow. New York architects have, in recent years, learned that fireplaces smoke, and will not draw in concrete houses unless the windows are loosely set or directly opened. This is not strange, when it is recognized that to burn a ton of dry wood takes all the oxygen in some five tons of air; and so, too, when a cow consumes a ton of air, she must use as nearly all the oxygen in five tons of air as she completely digests and utilizes the ton of hay. You know that her lungs are large, and that she breathes deeply and often. This is her measure of the need of oxygen. But a stable 50 x 50 feet, with 10-foot ceilings, is required to hold a single ton of air, and so more than five times such a volume must pass through a stove to burn a ton of wood, and must be breathed by a cow per ton of hay actually utilized by her.

A 1,000-pound cow breathes more than nine pounds of air every hour, and the nine pounds measure more than 115 cubic feet, so that, unless she breathes it over and over again, more than this amount must enter the stable per cow per

hour. Does it seem to you reasonable that in a stable for 20 cows, 20 times this amount of air could enter the stable on still nights by the slow process of diffusion alone through two square feet of muslin per cow? But there is no possible ground for doubt that the air enters muslin-ventilated stables almost wholly under the influence of air pressure, and that the air pressure results almost wholly from wind movement. We have, by direct measurement, shown to what extent muslin, such as Mr. Santee recommends, will reduce an 11-mile wind in passing through it into the stable, and this, too, was when all windows were open on the opposite side of the stable; and it is because the air must enter the stable so slowly through muslin screens when the wind is less than two miles per hour that inadequate ventilation must be the result in tightly-constructed stables, where there is no other means of ventilation.

Those who have used the screens, express themselves surprised that so little cold penetrates the stable, even in severe, windy weather, and it is only the absence of dampness in the stables that forces them to think they are having ample ventilation. But the absence of dampness is due to the fact that, as the warm, damp air of the stable circulates by convection currents and is brought against the muslin, it is there condensed and drawn by capillarity to the outside, where it evaporates, even in below-zero weather, just as it does when we say "clothes freeze dry." But the carrying of moisture out of the stable in this manner, with the bad odors which it absorbs, does not mean that large volumes of oxygen are brought in from the fresh air, nor even that the carbonic acid is carried out. The air of the stable is, of course, better to the extent that it is

fresh air drawing through at the bottom, and the warm air forcing out at the top, as the result of difference in weight due to difference in temperature.

Dr. Reynolds, of the Minnesota Experiment Station, has found that a steer in a tightly-closed box stall may gain in weight and appear well at the end of three weeks, when the air of the stable is so bad that the dampness and fermentation have taken off the paint, and when the person, going directly into the foul air, not only feels oppressed, but for a moment or two is unable to stand steadily on his feet. Now, it would be almost criminal for authorities to draw conclusions from such experiments that no special provision for ventilation need be made. If we will recall our own experience with ourselves and our associates, we know that some people and some animals are extremely sensitive to conditions of deficient ventilation, while others are so obtuse to those conditions that they are not conscious of serious inconvenience when in extremely foul air; but those people and those animals which are thus sensitive to conditions of bad ventilation must break down under it and become the prey of contagious diseases, providing the conditions for contracting them are present, and hence no conditions of stable or house ventilation are safe which do not provide for the weakest and most sensitive occupants; for, otherwise, not only do these succumb, but they must become a source of danger to those better able to resist.

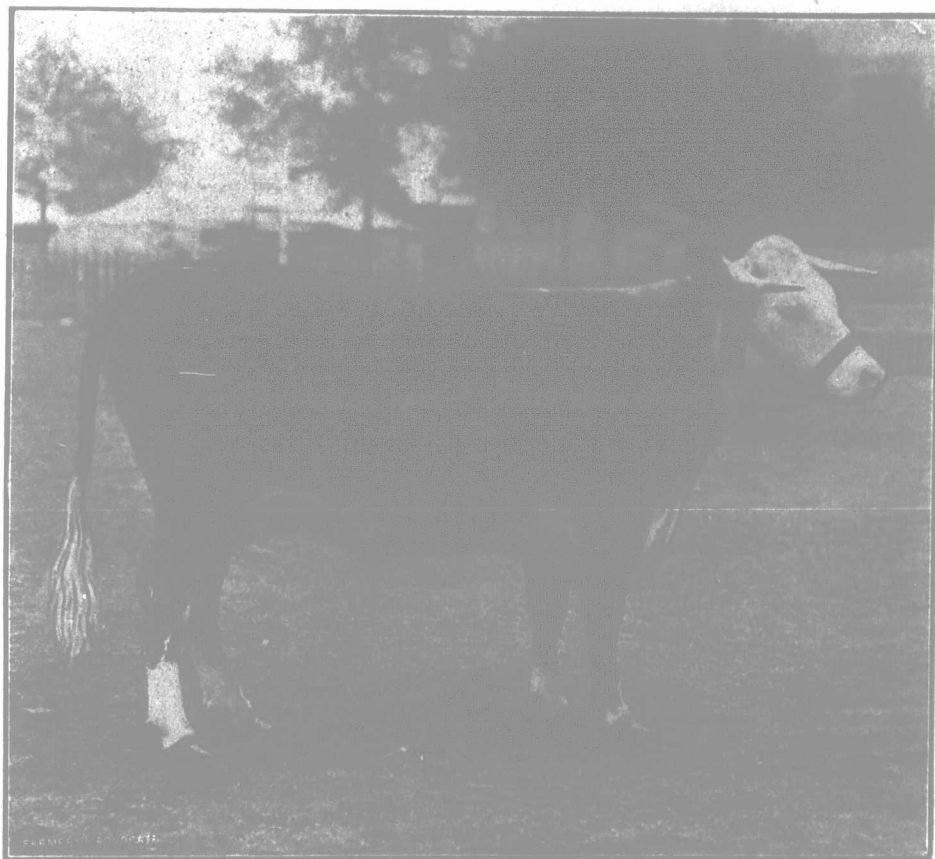
It is because of such conditions as these, and many others which cannot here be stated, that I feel justified in insisting that no ventilation system is good enough which does not provide ample ventilation at all times, whether the wind is blowing

strongly or not, and because muslin ventilation, as it is being advocated, does not and can not utilize the available forces for automatic ventilation in such a way as to insure ample ventilation at times of low wind velocity, where large numbers of animals are housed together, that I have been trying to present the matter so that the weakness of the system can be realized. We, of course, concede that, if there is enough muslin surface, well distributed, even in large stables, sufficient ventilation would be provided whenever the wind movement outside is sufficiently rapid to carry enough air in through one set of screens and out through the opposite set. We also concede that if muslin screens are used in connection with ventilating shafts, as is the case—in fact, in some of the cases Mr. Santee cites—

good ventilation may result. But what we do contend is that, in closely-constructed stables, with tight ceilings and tight walls, with no ventilating flues or hay chutes opening upward, ventilation by muslin screens must be entirely inadequate when the wind velocities are low, and for the simple reason that the simple process of diffusion, which Dr. Santee thinks underlies this system, but in which he is certainly mistaken, is entirely too slow to meet the demands of large herds of cattle housed in single compartments.

Madison, Wisconsin.

F. H. KING.



Jessie 9th of Ingleside —4697—.

First-prize two-year-old Hereford heifer, Canadian National Exhibition, Toronto, 1907. Bred and owned by H. D. Smith, Hamilton, Ont.

dryer, and may feel warmer, as Mr. Santee says, when it is in reality colder; but we must never forget that the absence of moisture condensing on the walls of a stable is not a proof of ample ventilation. So, too, should it be remembered that the condensation of moisture on walls and ceilings leaves the air of the stable purer than it would be if the walls and ceilings were warm enough so that the moisture did not condense. From this, it follows that a stable air may be more impure when, because of the lack of condensation, the moisture is not visible. Basement stables, with few and small windows, have always been regarded unsanitary for stock because of the evident dampness, but this invariably results from the stable being too tight to allow a sufficiently rapid change of air. In the use of cloth for poultry houses, we are very much afraid that, when the real facts are known, the sleeping chambers are in much less perfect sanitary condition than they appear to be, because of their apparent dryness, but it must be observed in this connection that, for poultry, not only is there a very much larger cloth surface, relatively, provided, but the space to be ventilated is very much smaller in proportion to this surface. Professor Gowell uses a cloth surface 20 feet by some 30 inches for 50 hens in their sleeping chambers, but 100 hens do not demand as much air as a single cow. More than this, the real change of air which takes place in these sleeping chambers is by convection currents, the cold,

THE ADVANTAGE OF LIVE-STOCK HUSBANDRY.

In his recent work, "Feeding Farm Animals," Prof. Thos. Shaw enumerates the following marked benefits that accompany the judicious keeping of live stock on the farm: (1) It increases profits; (2) aids greatly in the maintenance of fertility; (3) benefits rotation; (4) utilizes cheap foods; (5) insures cheaper transportation of farm products; (6) distributes labor more evenly throughout the year; (7) promotes industry in the farmer's household; (8) advances intelligence in the same; (9) tends to moor the young people to the farm home, to farm life; and (10) is essential to the highest development in the nation.