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Fall and Winter Material in Animal Husbandry

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the sun will have lost only one per cent of its mass in the next 1,600,000,000 years.

Notwithstanding the above mentioned transformations of energy into inert matter and the converse, it should be said that for everyday affairs we may still believe as firmly as ever in the validity of the laws of conservation of matter and of energy. The conversion of inert matter into energy or the converse is seen to occur only under conditions outside the experience of the majority of men. As long as we are dealing with objects having moderate masses and temperatures and speeds, we may still consider mass and energy as distinct entities, each indestructible and uncreatable, and we may deal with them in the customary manner.

W. H. KADESCH

FALL AND WINTER MATERIAL IN ANIMAL HUSBANDRY

Agriculture

Swine are now going to market in large numbers. This offers an excellent opportunity to study market types as represented in the herd and compare them with the sows from which they were produced. If brood sows for spring litters have not all been selected, the teacher has some valuable work for pupils in selecting the better prospects from the available groups.

The method of procedure will depend upon the quality of hogs that are available. If a herd can be found in which the farmer has marked the pigs so that litter mates can be recognized, no more valuable work can be found than that of separating the litters and comparing one with another. Usually in such cases a few outstanding litters will be found, as well as one or more that are inferior. This will suggest the desirability of keeping the dams of the best litters for further use in the herd, and will also show the value of marking pigs and keeping records so that we can apply the best of all tests to our breeding stock; ability to produce desirable offspring. This should be followed by a comparison of the dams of the better litters with the dams of the poorer ones, and a discussion of the value of conformation as compared with other factors in the profitable production of pork. Finally, a selection of a number of gilts from the best litters should be made, by a process of eliminating the poorer individuals. This method presents a practical working plan with a motive and is far superior to the mere formal judging of a few head of hogs. It should, of course, have been preceded by a thorough study of desirable types.

In case marked pigs are not available—and this is often true—a different method of procedure must be used, but the same general results should be sought. It would be best to begin with the old sows if any are left on the farm. By so doing we can often find characteristics which have reappeared in their offspring so that when we study the younger pigs, we can select litter mates even though they are not marked. This will be especially true if the old sows present any very great variations in type, and will enable us not only to recognize litter mates, but to obtain a valuable lesson in heredity also.

In many cases we will find that the pigs have not been marked, records have not been kept and, as happens far too often, the old sows have been disposed of without any regard for their breeding value. Even here we can make an attempt to select litter mates, and get a valuable lesson in types while so doing.

Another valuable practice, when hogs nearly ready for market and also breeding stock are found, is to assign grades to the market hogs and then check these classes or grades against the breeding herd. It will be well to place considerable emphasis on market classes, on grades of swine and upon the ability to determine grades, because of the modern tendency to sell by grade. If the formation of county concentration points, using direct sales by grade to the packer, continues to develop, it will be of great value to the farmer to be able correctly to appraise the value if his swine.

After having selected the breeding herd and assigned grades to those which are to go to market, consider next the question of winter quarters for the breeding herd and the requirements involved. If the members

of the class are taking work in manual training or farm shop work, valuable practice in both fields can be obtained either by building hog houses for farmers, or by repairing old houses and providing light and ventilation for them.

These studies of type in the breeding herd, of market classes and grades and of housing and equipment provide an excellent basis for the further study of management and feeding questions. This work will be the more valuable because we can apply it directly to the conditions studied in the field.

H. EARL RATH

HYDROSTATICS

(Continued from page 12)

fundamental principles of hydrostatics, with hardly a reference to fluids in motion. Furthermore, the discussion of hydrostatics centers upon three principles, viz., Archimedes' and the two dealing with static pressure. The two latter are: (1) The pressure in a liquid at rest varies directly with the depth and density of the liquid, (2) Any external pressure applied to an enclosed liquid is transmitted undiminished in all directions. It is necessary that the teacher keep clearly in mind these three great concepts and their practical bearing on modern environment. This should lead him to coordinate his lessons in a well-knit project group.

Experience has taught the writer that the average beginning student cannot readily discriminate between the two principles of liquid pressure in their practical application. Accordingly he should be led to realize that the first principle of pressure is one that follows from the weight of the liquid itself. It is applicable to liquids in natural containers as a lake as well as to those enclosed in such vessels as the standpipe of a city water system. To state that the pressure of water in a lake at the depth of 100 feet is about forty-three pounds per square inch, means that the weight of a column of water of one square inch cross section and extending one hundred feet below the surface is forty-three pounds. At a depth of 200 feet this pressure would be 86 pounds, thus increasing in direct ratio with the depth.

The second principle of pressure commonly discussed in high school texts is known as Pascal's Principle. It refers particularly to external pressures applied to liquids wholly enclosed, such as cylinders of barber's chairs. The difference between the effects of applying external pressure to a solid and to a liquid should first be stressed. If ten pounds of force are applied to a solid in a downward direction it means a total of ten pounds of force in that one direction. If, however, ten pounds of downward force are applied by a movable piston to a liquid enclosed in a cylinder, it means the application of a force in an upward, lateral and downward direction. The magnitude of the force on any surface of the enclosing vessel would be equal to its area times 10 pounds.

Three corollaries grow out of the laws of Hydrostatics. One, the so-called Hydrostatic Paradox, states that "the pressure of a liquid in the bottom of the open vessel enclosing it is independent of its shape and dependent only on the depth and density of the liquid." This is usually illustrated experimentally with Pascal's vases. It is not a new principle and can easily be deduced from the idea of gravity pressure. A second corollary records that "liquids in a system of connecting tubes rise to the same level regardless of the size or shape of the tubes." Since the gravity pressure of any liquid at a given depth would be transmitted equally to all other surfaces at that depth it is evident that the heights of the connected liquid columns must be equal. The third corollary states that "the pressure at any given point in a liquid at rest is equal in all directions." Were this not true it is clear that the various portions of a liquid could never come to rest. The instructor must be careful to subordinate these corollaries to the fundamental principles. In fact, one test of good teaching rests in the ability to discriminate clearly between a major concept and its incidental outgrowth.

(To be continued)

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