THE TRUE–FALSE STATEMENT

Teachers of agriculture are using the true-false statement and finding it a useful device for testing and teaching. Research workers have already made it possible to avoid some of the defects for which this device has been justly criticised. During 1926, a study of the true-false statement was published by Dr. C. C. Weidemann,[1] the study having been made possible by a grant from the Commonwealth Fund. Utilizing the findings of this and other studies, it seems worth while to discuss the making and using of the true-false statement from the viewpoint of the teacher of agriculture.

The writer has heard teachers of agriculture criticise the true-false statement most frequently on three counts. A discussion of these criticisms will introduce the subject. The first criticism is that the pupil who marks true-false statements may never know whether he has marked them correctly or incorrectly. To state the criticism in another way, the pupil is tested but not taught. The true-false statement has teaching values if the pupil can see wherein he has failed. Such a criticism may result from a confusion of the two functions, testing and teaching. It is not fair to criticise the true-false statement for its failure as a teaching instrument if testing has been its sole purpose.

The second criticism is that exposing the pupil to statements which are not true is faulty pedagogy. Lacking trustworthy evidence on this point, Ruch questions whether this criticism holds when a mental set is established to the effect that "some of the statements are true and some are false." This criticism again may in part result from a confusion of the testing and teaching functions. If the pupil has been taught and drilled in the field in which he is being tested, should a false statement raise havoc with his established learning? If so, his learning will not avail him much in every-day life. The critic too often assumes that the false statement is the pupil's first experience with a fact or principle.

The third criticism is that the teacher cannot go over the marked true-false statements of an individual pupil and determine his weaknesses. The teacher does not know whether the statements marked correctly are known or guessed. If the teacher discourages pure guesses by pupils, the statements left unmarked will indicate some of the pupil's weaknesses. Ruch,[2] however, points out that we cannot wholly eliminate guessing. He states that the choice of the responses falls into at least five more or less distinct categories, as follows:

1. A certain percentage of the responses are given with *high assurance.*
2. A certain percentage of the responses are given with *reasonable assurance.*
3. A certain percentage of the responses are given where the subject "feels" he is guessing; *but in reality he possesses a fringe of knowledge sufficient to make his guesses right very much oftener than wrong.*
4. A certain (usually very small) percentage of the responses are *pure guesses.* It is to be noted, however, that many subjects prefer to omit such items entirely.
5. A certain percentage of the responses involve the situation of the subject's being sure that his choices are correct, *when he is actually misinformed, his errors being in no sense due to guessing.*

We cannot meet this third criticism because guessing cannot be wholly eliminated. If pure guesses are eliminated, the criticism is partly met. The study of statements not marked will indicate some individual weaknesses. Such authorities as Paterson, Ruch, and Wood advocate directing the pupil not to guess.

A modification suggested by Russell[3] is interesting in connection with guessing because it eliminates guessing. Pupils are given a series of true statements and asked to give the best known reason why each of the statements is true. The reasons are scored subjectively and thus the objective nature of the true-false statement largely disappears. This modification is a valuable testing and teaching device for small units of subject matter.

Some of the criticisms of the true-false statement have been omitted.. More constructive suggestions are divided under two heads, (1) the mechanical form of the true-false test or examination and (2) formulating the statements.

Weidemann gives very definite suggestions on the mechanical form of the true-false statement. Both from the stand-

[1] Weidemann, C. C., How to Construct the True-False Examination.

[2] Ruch, G. M., The Improvement of the Written Examination.

[3] Russell, Chas., Classroom Tests.

THE VISITOR

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point of the pupil and the scorer, the symbols + for true and 0 for false are chosen. Each statement should be numbered at the left and at the left of the number a response space 5/16 inch long is placed—

———— 1. ....

The directions favored for pupils who have had little or no experience with the true-false statement are:

"Each of the statements below is either true or false. If a statement is TRUE, put a plus sign (+) on the dotted line to the left of the *true statement*. If a statement is partly or entirely FALSE, put a zero (0) on the dotted line to the left of the *false* statement. Do not mark a statement for which you have no decision.

DO NOT GUESS. Guessing reduces your score.

Do all the easy ones first, then return and do the harder ones.

Do not talk or ask questions."

The method of scoring true-false examinations is based on the fact that a pupil who does not know whether a given series of statements are true or false will mark as many correctly as incorrectly. If there are 100 statements he will mark 50 correctly and 50 incorrectly. The deserved score is zero. If a pupil marks 60 statements correctly and 40 incorrectly, we assume that he made 40 good guesses with his 40 bad guesses. This leaves 20 statements which he knew how to mark correctly. Thus we derive the rule that Rights (60) minus Wrongs (40) equals Score (20).

More important than the mechanical phase of the true-false statement is the formulation of desirable statements. In general, it may be said that a true-false statement should consist of a simple declarative sentence containing one idea and conforming to the rules of sentence structure. Several illustrations of defective statements follow. These will be discussed and revised.

  +   1. Redtop grows in the poorly

drained portions of the field and requires little lime.

There are two ideas in this statement. The pupil, if he knows that a part of the statement is true or false, tends to guess on the remaining part. This kind of statement increases the amount of pure guessing. Moreover, the teacher is less able to discover whether the pupil knows either of the facts than if two statements are constructed. The word "little" needs clearer statement.

(Revision) + (a) Redtop grows in the poorly drained portions of the field.

  +   (b) Redtop requires little lime in comparison with other hay plants.

  0   2. If a farmer has a sufficient knowledge, it is more satisfactory for him to select good cows of no particular breeding and develop a breed to suit his own needs rather than adopt one of the well known breeds.

A long sentence is undesirable because the pupil finds it necessary to hold in mind all the clauses and at the same time decide on the truth or falsity. A pruning of the above statement will keep its meaning and make it less difficult for the pupil to encompass. Elimination of useless modifiers is called for.

(Revision) 0 A farmer with sufficient knowledge of breeding should select good cows of no particular breed and develop a breed to suit his own needs.

  +   3. When the corn enterprise is combined with the swine enterprise, it is contributory to it.

The indefinite pronoun "it" is the cause of much confusion in a true-false statement because the antecedents are doubtful. In this statement we cannot be certain whether corn is contributory to hogs or hogs to corn.

(Revision) + When both are found together, the corn enterprise is contributory to the swine enterprise.

  +   4. Minorcas, like Leghorns, lay white eggs, although very large.

This statement gives another example of ambiguous antecedents. Either white eggs or Minorcas could be the antecedent of the final clause.

(Revision) + Minorcas lay large white eggs.

  +   5. There is a small proportion of minerals only in corn.

Misplaced modifiers are a cause of confusion. The rule is to place the modifier as near the word modified as possible. The word "only" goes preferably just before or just after the word it modifies. The word "there" is indefinite and colorless as a beginning of the statement.

(Revision) + Corn contains only a small proportion of minerals.

___0___ 6. An early moulting hen lays about as many eggs per year as a late moulter.

This phrase contains the phrase "about as many" which is inexact and unsuitable in a true-false statement. The statement is somewhat misleading because one might interpret the statement, "Any early moulting hen lays about as many eggs in a year as any late moulting hen."

(Revision) 0 The average early moulting hen lays as many eggs per year as the average late moulting hen.

The defective statements given represent only a part of the possible defects of a true-false statement. These examples may suggest that many other rules of sentence structure may be violated in true-false statements.

Another variation in the use of true-false statements has possibilities in teaching agriculture. The law schools have developed this variation in connection with the case method of teaching. A case is first given and then true-false statements based on the case are formulated. An example follows:

A farmer has a choice of three fields on which to grow oats during the coming season.

Field A has a clay loam soil; it has been in clover during the past season.

Field B has a sandy loam soil; corn was grown on it during the past season; the soil is slightly acid; the topography is rolling.

Field C has a silt loam soil; corn was grown on it during the past season; the field is level; it is infested with weeds.

Mark the following statements true or false:

With relation to Field A

_____The water holding capacity of a sandy loam is greater than that of a clay loam.

_____Experiments show that oats require more water to produce a pound of dry matter than the other important small grains.

_____Oats yields better, other conditions being equal, on a sandy loam than on a clay loam.

_____Oats rank first among the small grains as a coarse feeder.

With relation to Field B

_____Oats is better adapted to sandy soils than any other small grain except rye.

_____Oats commonly follow another small grain in the rotation.

_____The oat plant has a low lime requirement.

_____Poor drainage is one of the causes of lodging.

With relation to Field C

_____Oats is more successful than barley in competing with weeds.

The study of a large number of true-false statements shows that true statements tend to be more frequently constructed than false statements. Since it is desirable to have approximately the same number of true and false statements in a test, the teacher must often change true statements to false statements. In this situation avoid the easiest way, i.e., inserting the word "not." The word "not" makes a statement unnecessarily confusing to the pupil. For example, if the true statement, "The Wealthy apple is an early bearing variety," is to be made false, do not state that "The Wealthy apple is not an early bearing variety," but rather that "The Wealthy apple is a late bearing variety."

The pupil who does not know but who is careful to study the wording of true-false statements may make a showing unless certain precautions are taken. Weidemann shows how a pupil might make a score of 19 on the basis of 151 statements and know nothing of their trueness or falseness. This score might be fairly high in a difficult examination.

A plus score without a knowledge of the subject is made possible by what Weidemann calls specific determiners. From the study of a large number of statements Weidemann finds that such statements as the following have specific determiners:

_____1. Holstein cows always produce 10,000 lbs. of milk a year.

_____2. Jerseys are smaller than Guernseys.

_____3. Jerseys endure hot weather because of their small size.

The first illustrates an "always or never" statement which Weidemann finds is false two out of three times. The second illustrates a "degree or comparison" statement which is true two out of three times. The third shows a "cause or reason" clause which two out of three times is false.

The remedy for specific determiners is to balance rather than to eliminate. Statements containing specific determiners are often desirable. If the teacher has an equal number of true and false statements containing "always and never" statements, no harm is done. Likewise the other kinds of specific determiners can be balanced.

Clear thinking and clear expression are essential to the successful use of the true-false statement. A proper use of this device will disarm many of the criticisms of it.   F.W.L.

ALFALFA TAUGHT AT BEMIDJI

William Dowdell, teacher of agriculture at Bemidji, has taught alfalfa this year in such a manner as will satisfy the most vocationally minded critic. Twenty-one of his boys grew one or more acres each. Remember that Bemidji is in northern Minnesota where an acre of cleared land is usually a substantial percentage of the total cleared acreage of a farm.

The boys studied alfalfa in the classroom, more effectively, needless to state, because of the waiting problems at home. The parents of the boys took a keen interest in alfalfa; eighteen acres were grown by them. Most of this acreage was the direct result of the boys' activities.

Not satisfied with inoculating boys, parents, and community with alfalfa, Mr. Dowdell included alfalfa in two courses which he gave to a total of fifty-five rural teachers at the Bemidji State Teachers College. These teachers learned alfalfa and how to teach alfalfa.

The method of procedure has several interesting features. Only certified Grimm alfalfa seed was used. In some cases the parents had used common alfalfa seed with poor results. Mr. Dowdell stressed the importance of good seed. Each boy secured the use of one acre of land. A wide range of soils and other conditions were obtained which allowed a comparison of different practices. Each boy was required to keep a record of his plot. All plots were tested for soil acidity.

Many practices and methods were compared by the boys. The following is a sample report by Wellington Schroeder on the use of fertilizer and lime. See the plan of his plots at the bottom of this page.

"In this test Plot No. 4 showed the more even stand.

Plot No. 5 has best growth, but there was a low spot that does not appear as uniform, otherwise it had taller alfalfa and a thicker stand.

Plot No. 6 was third, but was close to No. 4. It also had a low spot.

Plot No. 7 was about the same as Plots Nos. 2 and 3. There was not much difference between Plots Nos. 2 and 3. These plots showed a good improvement over Plots Nos. 1 and 8.

Therefore the test shows that commercial fertilizer is better to start alfalfa than lime, but that it also pays to apply lime.

Better results can be checked next year. The soil is light sandy loam. On the low ground it is heavier."

Some of the phases of alfalfa growing studied are:

Fall vs. spring plowing of alfalfa land.
Value of commercial fertilizer.
Value of lime.
Marl vs. lime.
Early and late seeding.
Sowing with and without a nurse crop.
The rates of seeding varying from 9 to 14 pounds.
Soil types for alfalfa.
Method of inoculation.

Mr. Dowdell points out that accurate conclusions cannot be drawn at this time as to the best practices. Thus we may infer that the work will be continued over a period of years. It is certain that work of this kind done by a teacher of agriculture will leave its permanent impress on the farming of our state.

F.W.L.

This diagram shows Wellington Schroeder's plots on which he studied the effects of varying amounts of lime and commercial fertilizer for alfalfa. The plots on the ends were untreated in order to give a basis of comparison.

60 rods							
No. 8	No. 7	No. 6	No. 5	No. 4	No. 3	No. 2	No. 1
Nothing	15 lbs. C.F.	30 lbs. C.F.	60 lbs. C.F.	30 lbs. C.F.	125 lbs. lime	250 lbs. lime	Nothing

C.F.—Commercial fertilizer, 3-8-5.