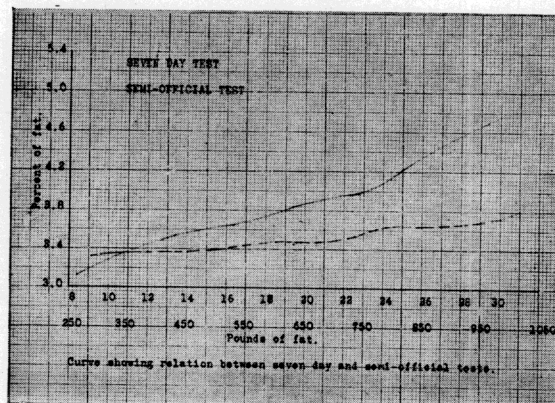
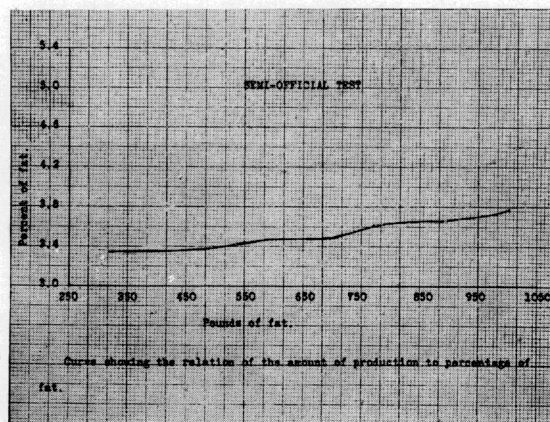
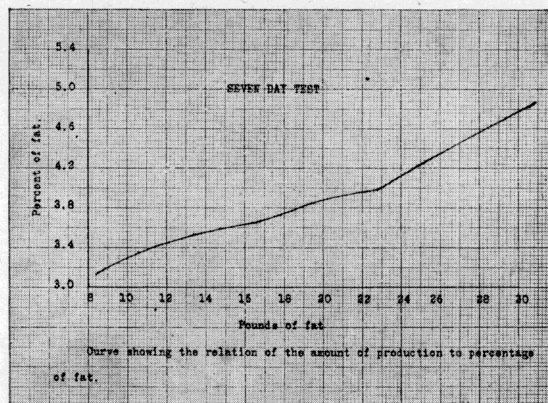


A STUDY OF THE RELATIVE RELIABILITY OF OFFICIAL TESTS OF DAIRY COWS

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To those who are familiar with the dairy industry, I need not point out that, during the past twenty years, there has been a significant increase in the United States, both in respect to the number of milch cows and to the amount of milk and butterfat produced. But out of all proportion to this increase has been the increase in advanced registry testing, or the conducting of official tests for ascertaining the milk and butterfat production of pure-bred cows. In the few moments which I have to speak I cannot even touch upon the extent of this increase or upon the factors which have tended to bring about this growth, but I must begin directly with the discussion of the relative reliability of these tests.

I shall not attempt to report on my findings except with regard to two tests, the seven-day test and the semi-official test. These tests as studied apply only to the Holstein-Friesian breed of dairy cattle. Briefly stated, the seven-day test is an official test, which means that the supervisor or tester weighs and tests the milk of each milking separately, being present at



each and every milking during the entire testing period. The semi-official, long-time test usually covers a yearly period. By semi-official test we mean one in which the percentage of fat in the milk is determined by an official test which covers a period of not less than two consecutive days each month. The approximate fat production for the month is found by multiplying the weight of milk which the owner supplies by the per cent of fat found during the period of official test. The total fat production for this period is the sum of these various monthly credits.

In making the comparisons between these two tests the records are taken from the Holstein-Friesian Advanced Register, the official publication of the organization. Only comparable records are considered. By comparable records is meant that the records, both seven-day and semi-official, must be made by the same cow during the same lactation period.

It is interesting to compare these tests with respect to the percentage of fat which each carries, keeping in mind that the same group of cows is considered in each case. Table 1 shows the relation of percentage of fat to amount of production for the seven-day test.

TABLE 1—RELATION OF PERCENTAGE OF FAT TO AMOUNT OF PRODUCTION—SEVEN-DAY TEST

Class of Intervals # Fat	Frequency	Lbs. Milk	Per Cent Fat	Lbs. Fat
Under 9 1/4 Fat	28	268.4	3.14	8.415
9.01-12.00	192	318.5	3.36	10.697
12.01-15.00	350	381.0	3.53	13.441
15.01-18.00	374	453.1	3.64	16.479
18.01-21.00	214	503.0	3.84	19.325
21.01-24.00	114	574.6	3.97	22.837
24.01-27.00	18	587.1	4.26	25.025
27.01-30.00	4	567.5	5.15	29.226

A study of Table No. 1 shows that low fat production is accompanied by a low fat percentage, whereas high fat production is secured to a considerable degree by a high fat test. If we disregard the last class, which has but four records from which to draw an average, we find that the difference in fat percentage between low and high production is 1.12 per cent. Compare with this the fat percentage found for the semi-official test of the same cows during the same lactation period.

TABLE II.—RELATION OF PERCENTAGE OF FAT TO AMOUNT OF PRODUCTION—SEMI-OFFICIAL TEST

Class Intervals # Fat	Frequency	Lbs. Milk	Ave. Per Cent Fat	Ave. Lbs. Fat
251- 350	83	9538.7	3.35	320.585
351- 450	349	12100.6	3.35	405.382
451- 550	410	14747.0	3.39	499.977
551- 650	270	17142.1	3.47	595.983
651- 750	122	19875.9	3.48	691.735
751- 850	35	21720.8	3.62	787.161
851- 950	16	24453.3	3.65	892.332
951-1050	9	26225.6	3.79	993.367
1051-1150	1	24612.8	4.53	1116.050

Omitting the last class in which but a single record occurs we find that cows which produce 320.59 pounds fat test, on the average, 31.35 per cent fat, whereas those cows which produce 993.32 pounds fat test, on the average, 3.79 per cent, a difference of but .44 of 1 per cent. This would seem to indicate that the semi-official test is more uniform with respect to percentage of fat both in low and in high production than the seven-day test.

Even more interesting and significant than the study of the relation of these two tests with respect to fat percentage is that of the correlation which exists between them. By using the standard method for calculating the correlation coefficient we find that the correlation which exists between seven-day and semi-official fat production is $.662 \pm .011$. This for many purposes would be regarded as a high degree of correlation, but it is not so regarded between two measurements of the same thing, namely the productive ability of a given group of cows. The correlation between seven-day semi-official milk production is $.658 \pm .011$, almost the same as the correlation found for fat production.

It would seem from these studies that the seven-day test is not a very dependable criterion by which to judge semi-official or yearly production.