

patron and measure into this with a 5 c.c. pipette a sample of his milk each day for seven days. The bottle will then contain double the usual test sample, and by adding double the usual amount of acid, the test may be completed as with fresh milk. It is well to shake up the contents of the bottle before adding the acid. But it should be remembered that when a double test sample is used each division on the neck of the test bottle is then only one-tenth per cent. while with a single test sample it reads two-tenths per cent. A composite test for three days can be obtained in the same way with a common bottle by using a pipette containing 5.9 c.c., making the test in just the same way as with fresh milk.

HOW TO DETECT WATERED MILK.

31. A Simple Formula. After milk has stood from two to three hours the lactometer reading may be and generally is from one to two degrees higher than it was on the same milk immediately after it is drawn from the cow, hence it is quite impossible to get a strictly accurate formula.

But the writer's aim is to give a simple formula only approximately accurate, but nevertheless a very valuable guide which may be quickly applied by any intelligent person in a few minutes' time.

32. Directions for Using the Quevenne Lactometer. For convenience in the following explanation we assume that L. R. means Lactometer Reading. T. means Temperature.

Send to some dairy supply house for a Quevenne Lactometer, and a glass tube about two inches in diameter and ten inches high (or a tin cylinder of that size is sometimes used). Take a sample of the milk you wish to test, mix it well, and pour it into the tube to within three inches of the top. Then insert the Lactometer carefully, and pour in enough milk to fill to the top.

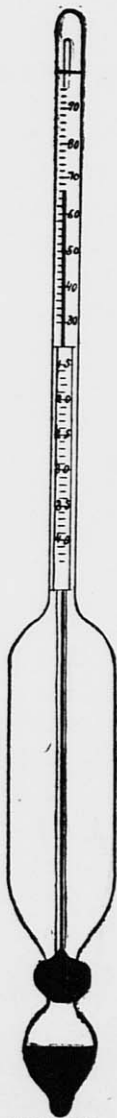
Observe the division of the scale which corresponds with the surface of the milk for the lactometer reading.

Find the temperature of the milk, as the correct lactometer reading is only obtained at 60° F. A lactometer with a thermometer attached is best. Where the two instruments are combined the thermometer scale should be above the lactometer scale so that both readings may be taken without removing the lactometer from the milk. If the temperature should not be just 60° the lactometer reading may be corrected by the following rule.

33. Rule for Correcting the Quevenne Lactometer Reading.—Within the range between 50° and 70° .

First.—If the T. is above 60° add one-tenth to the L. R. for every degree it is above 60° .

Second.—If the T. is below 60° subtract one-tenth from the L. R. for every degree it is below 60° .



QUEVENNE
LACTOMETER.

34. Examples Under the Above Rule.

L. R. 32, T. 68° . Correct L. R. 32.8.

L. R. 26, T. 55° . Correct L. R. 25.5.

35. The Next Step. After you have found the correct L. R. under the above rule, the next step will be to find the per cent. of fat in your sample. Then you are ready to figure for water.

36. About Solids Not Fat. Solids not fat in average milk is about nine per cent., but it may run as low as 8.5 pounds in a hundred pounds of milk. Hence we adopt that as a standard, and for the following reason: Suppose we would adopt 9. as a standard, then all those that have cows giving milk containing less than 9 per cent. solids not fat, could be accused of watering—8.5 is a safe standard.

37. Rule for Finding Solids Not Fat. Multiply the per cent. of fat by .7, add the product to the correct L. R. and divide the sum by 3.8 the quotient will be the solids not fat in your sample.

38. Examples Under the Rule.

1st—Fat 4. Correct L. R. 32.

$$4 \times .7 = 2.8 \text{ and } 32 + 2.8 = 34.8 \text{ and}$$

$$34.8 \div 3.8 = 9.16 \text{ solids not fat} = \text{normal milk.}$$

2d—Fat 3. Correct L. R. 26.

$$3 \times .7 = 2.1 \text{ and } 26 + 2.1 = 28.1 \text{ and}$$

$$28.1 \div 3.8 = 7.4 \text{ solids not fat} = \text{watered milk.}$$

39. Rule to Find the Amount of Water. Subtract the obtained solids, not fat, from 8.5, multiply the remainder by 100, and divide it by 8.5, the quotient will be the per cent. of water in the sample.

40. Example Under the Rule. We take the above 2d

example: $8.5 - 7.4 = 1.1$ and $1.1 \times 100 = 110$. $110 \div 8.5 = 13$. Same as 13 per cent. water in sample.

41. How to Use a Common Lactometer. A common lactometer can be used in place of a Quevenne by observing the following:

Temper your milk to 60° F.

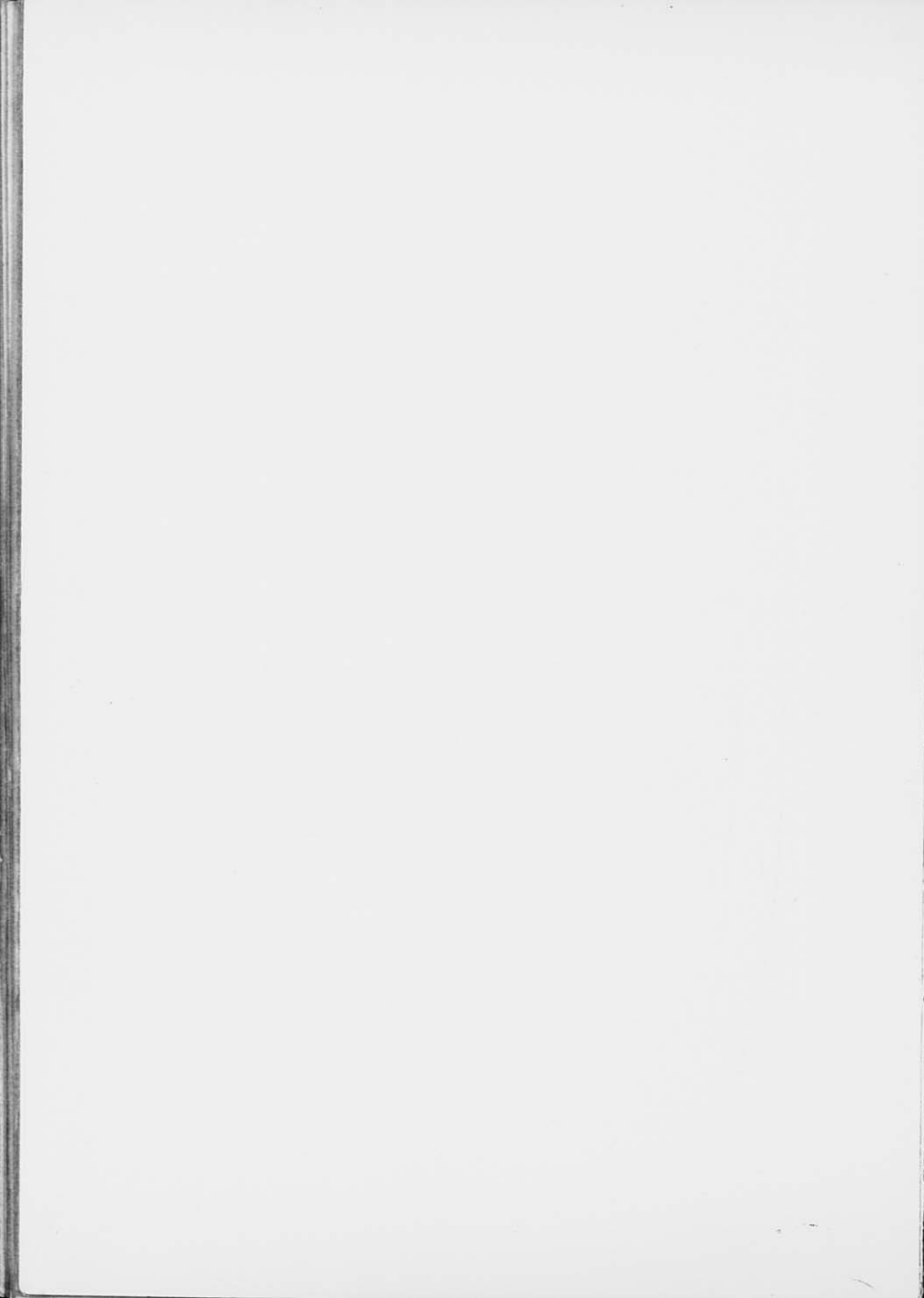
Insert the lactometer and take the reading. Then multiply the reading by .29, which will reduce it to a Quevenne lactometer reading. Suppose your reading is 100 and $100 \times .29 = 29$. This being what it would read by the Quevenne lactometer. Suppose, again, the reading is 110 and $110 \times .29 = 31.9 =$ Quevenne lactometer reading. By observing the above rules a common lactometer could take the place of a Quevenne, but it should be remembered that cheap lactometers are not reliable as a rule.

42. About Testing at the Wisconsin Dairy School. Each student in the Laboratory Section is required to make tests (testing either milk, cream, whey, cheese or butter), and make out a report of his work on a blank furnished by the station. Composite milk testing, on account of its great importance, has received special attention for the last two winters. Figures obtained by the students under this work may be found in this book.

The following is a blank, showing the work of a student covering one composite test extending over a period of ten days. In the blank, under Adulterations, we see m96.58 w3.42, which shows that 100 lbs. of the sample contains 96.58 lbs. of milk and 3.42 lbs. of water:



STUDENTS TESTING MILK—WISCONSIN DAIRY SCHOOL.



UNIVERSITY OF WISCONSIN—SCHOOL OF DAIRYING.

Report by P. E. WALLINE, No. 73. DATE, Feb. 14, 1894.

MILK TESTING.

NUMBER OF SAMPLE.	LACTOMETER READING.	TEMPERATURE.	CORRECTED READING AT 60.	PER CENT. OF FAT.	SOLIDS NOT FAT.	ADULTERATION: KIND AND AMT.	FAT BEFORE WATERED.
11	29	58	28.8	3.45	8.21	m96.58 w 3.42	3.57
12	25	56	24.6	3.00	7.02	m82.6 w17.4	3.63
70	27	59	26.9	1.90	7.43	m87.4 w12.6	2.17 Skim'd.
89	26.5	70	27.5	3.55	7.89	m92.8 w 7.2	3.73
82	34	50	33.	2.20	9.09	Skimmed.	.....
70	31	67	31.7	2.80	8.86	Skimmed.	.....
Total	.....	.....	172.5	16.90	48.50	.....	.....
Average	.....	.....	28.7	2.81	8.08	.....	.....
Compos- ite .. 28.5	63	.....	28.8	2.80	8.09	.....	.....

N. B.—Students are required to work on a three per cent. fat basis, and an 8.5 per cent. solids, not fat, basis.

HOW TO DIVIDE THE MONEY.

43. The Correct Way. Let us suppose that there is one composite test taken weekly, and

A	has for the first week	2,046 lbs. milk-test,	3.2 equals fat	65.47.
B	" "	822 " "	4.1 "	33.70.
C	" "	625 " "	4.6 "	28.75.
A	has the second week,	1,820 " "	3.3 "	60.00.
B	" "	780 " "	4.0 "	31.20.
C	" "	735 " "	4.2 "	30.45.