

## Interpretation of Pasteurization Recording Charts

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CHARTS of pasteurization recording thermometers are the only means available for furnishing the plant operator and owner, or the inspector and health officer with a record of the pasteurization process. It is only upon this record that the pasteurization plant operator can show that he actually has pasteurized his milk supply. Likewise, it is also upon this record that the inspector or health officer can determine whether or not the pasteurization of milk is being properly accomplished. It is essential, therefore, that the record be accurate and complete if it is to be of any value.

For the purpose of this discussion, only pasteurization recording thermometer charts for pasteurizing at 143 degrees for 30 minutes will be covered, and we will assume that the indicating, recording and air space thermometers meet the specifications for time and temperature accuracy. (Such specifications for thermometers can be found in the 1939 edition of the U.S.P.H.S. Milk Code.) We will also assume that the pasteurization vat is properly constructed, so that if properly operated, it will assure pasteurization of every particle of milk in the vat.

Assuming that the thermometers are accurate and that the pasteurization vat is properly constructed, we have but two important matters to control, insofar as pasteurization itself is concerned. They are: First, minimum holding time, and secondly, proper temperature. Other essential information should be included on the chart.

To insure a minimum holding

**NOTE:** This paper was designed to teach inspectors and sanitarians in Michigan who come in contact with the holding method of pasteurization.

period, when the milk is heated in the vats, the pasteurization vats or holder should be so operated that the recorder charts will indicate at least 143 degrees Fahrenheit for a period of not less than the following:

- (a) If the cooling process is started in the holder simultaneously with, or before, the opening of the outlet valve, a 30-minute holding period shall be shown on the chart.
- (b) If cooling is started in the pasteurization vat or holder after the opening of the outlet valve or is done entirely outside of the vat or holder, a holding period of 30 minutes plus the emptying time to the level of the recording thermometer bulb, or 30 minutes plus the time interval before the cooling of the milk was started in the vat, shall be shown on the chart.

No milk should be added to the pasteurizing vat after the start of the holding period. The holding period is calculated from the time the milk reaches the required temperature after the addition of the last milk in the vat.

The manner of providing a complete record on the chart is relatively simple. All recording thermometer charts should be preserved for a minimum of ninety days. No chart should be used for more than one day and all charts should have the following information noted on them by the operator of the pasteurizer:

- (a) Date.
- (b) Number or location of the recorder if more than one is used.
- (c) Reading of the indicating thermometer at a time indicated on the chart during the holding

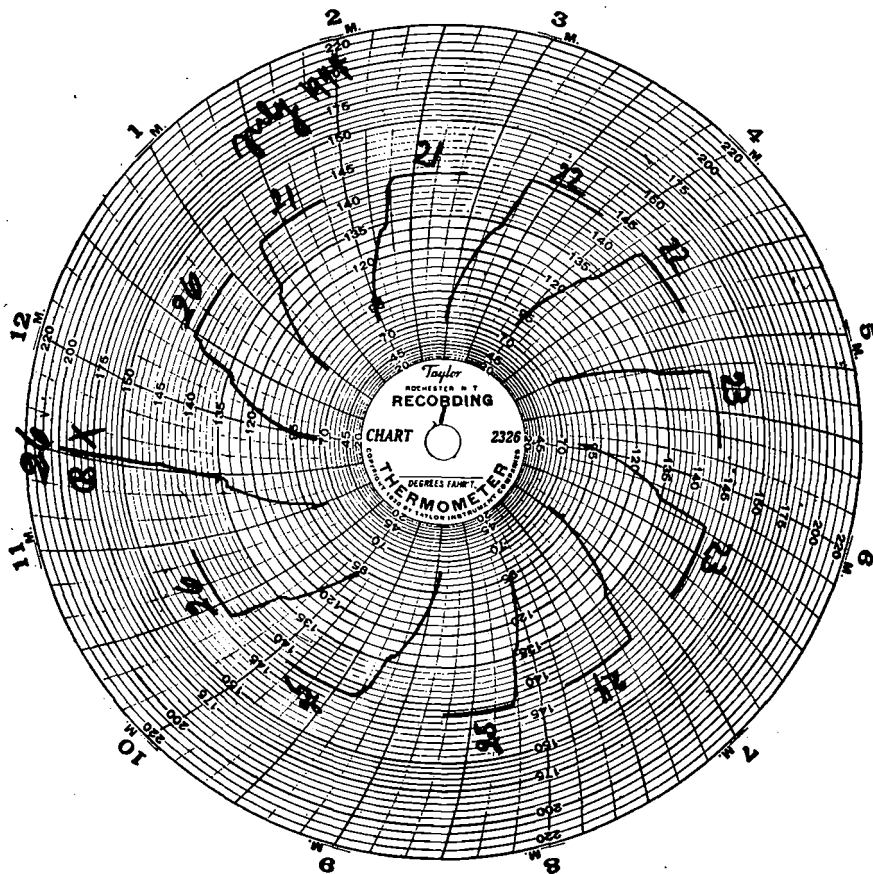


CHART I

period. This same notation shall be made at least monthly by the inspector whose initials will be entered opposite the recorded reading.

- (d) The time accuracy of the recorder, as found by official tests shall be entered on the charts monthly by the inspector.
- (e) Amount of milk or milk products represented by the chart.
- (f) Record of unusual occurrences.
- (g) Signature or initials of operator.

In order that we fully understand these principles, let us study and then discuss the following charts. (Series of slides shown.) These charts are some that have been taken directly

from the field and have not been altered.

Chart No. 1. Improper Chart— This chart does not meet specifications and is of no real value.

- (a) It was used for more than one day and therefore does not give any accurate information as to the actual date of pasteurization.
- (b) There is no notation relative to the amount of milk or milk products that were processed.
- (c) There is no signature or initial to indicate who was in charge of the processing operation.
- (d) Each daily line record does not record a long enough

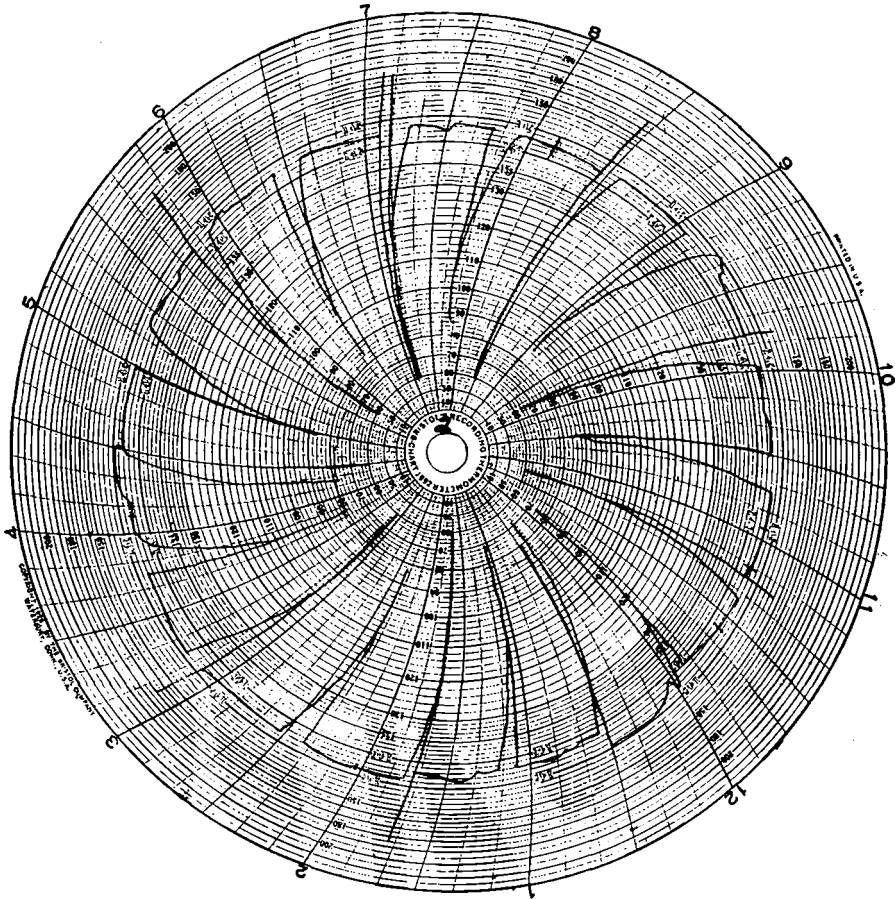


CHART II

period of operation. You will note that the line record shows only a 30-minute 143-degree Fahrenheit record and then the record is discontinued. This means that if an operator heated the milk up to 143 degrees Fahrenheit, held it at that temperature for 10 minutes and then began emptying the vat for filling and bottling and it took 20 minutes to empty the vat down to the bottom of the recorder thermometer bulb, the line record would still show 30 minutes holding when in reality some of the milk had

been held for only 10 minutes. It is because of this that it is essential to insist on a complete record of the complete pasteurization process by leaving the pen arm on the chart during entire day's operation.

Chart No. 2. Improper Chart— This chart is absolutely valueless, inasmuch as it has no definite information on it. There is no date, no signature, no indication of volume or product processed, the line records are not complete, nor are the charts identified in any manner. This type of chart indicates lack of proper supervision.

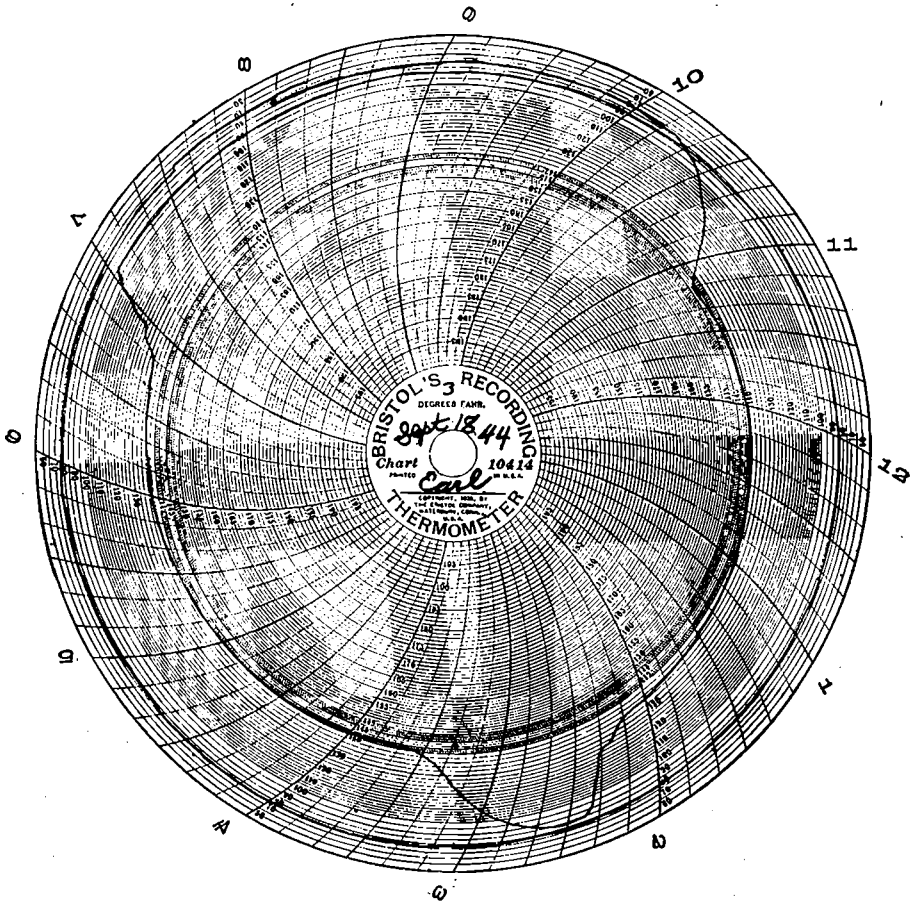


CHART III

Chart No. 3. Improper Chart— This chart has value but does not supply complete information. The chart does give a line record of the complete day's operation, yet it is dated and signed. It does not, however, give any information relative to

the volume of milk processed nor the specific product processed, nor does it indicate that the thermometer reading was checked during a holding period.

With very little added information the record on this chart would be complete.

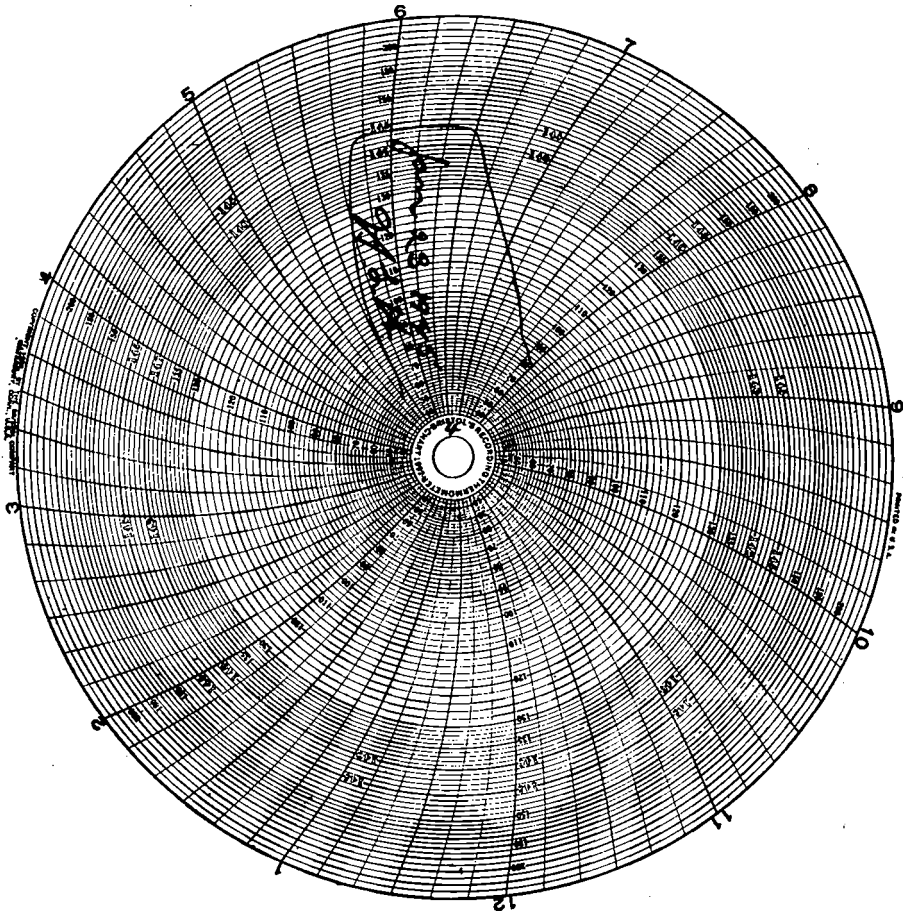


CHART IV

Chart No. 4. Improper Chart— This chart has only partial information and it was determined during inspection that the line record was in error with regard to actual time indicated.

The chart lacks information as to volume and specific product being processed and there is no indication that the thermometer reading was

checked during a holding period. As a matter of fact, the pasteurization process was being carried on between 10:00 A.M. and 12:30 A.M., but the recording chart indicates that the process occurred between 5:30 and 8:00 o'clock, which is in error. This error occurred because the chart was not properly placed on the recorder. The line record, too, should be extended to tell a complete story.

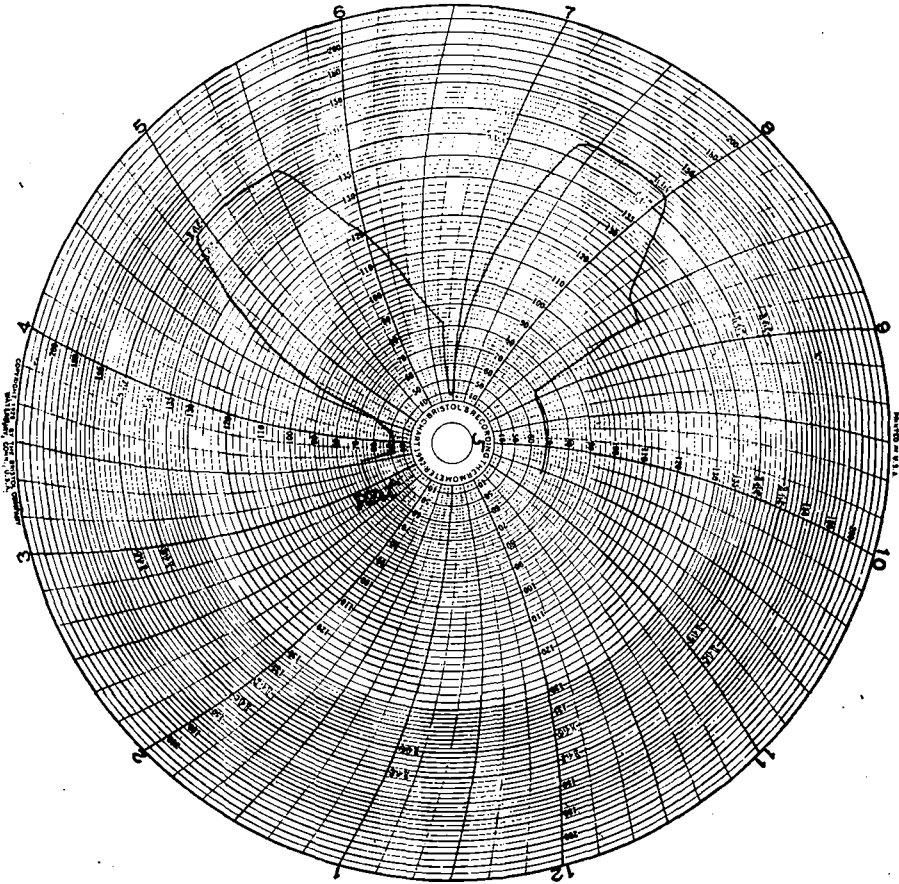


CHART V

Chart No. 5. Improper Chart— This chart looks good and does give information of value to the processor and inspector, but it lacks some necessary information. There is no notation relative to the volume of milk

processed nor of the product being processed. There is no date or signature of operator and there is no indication that the thermometer reading was checked during a holding period.

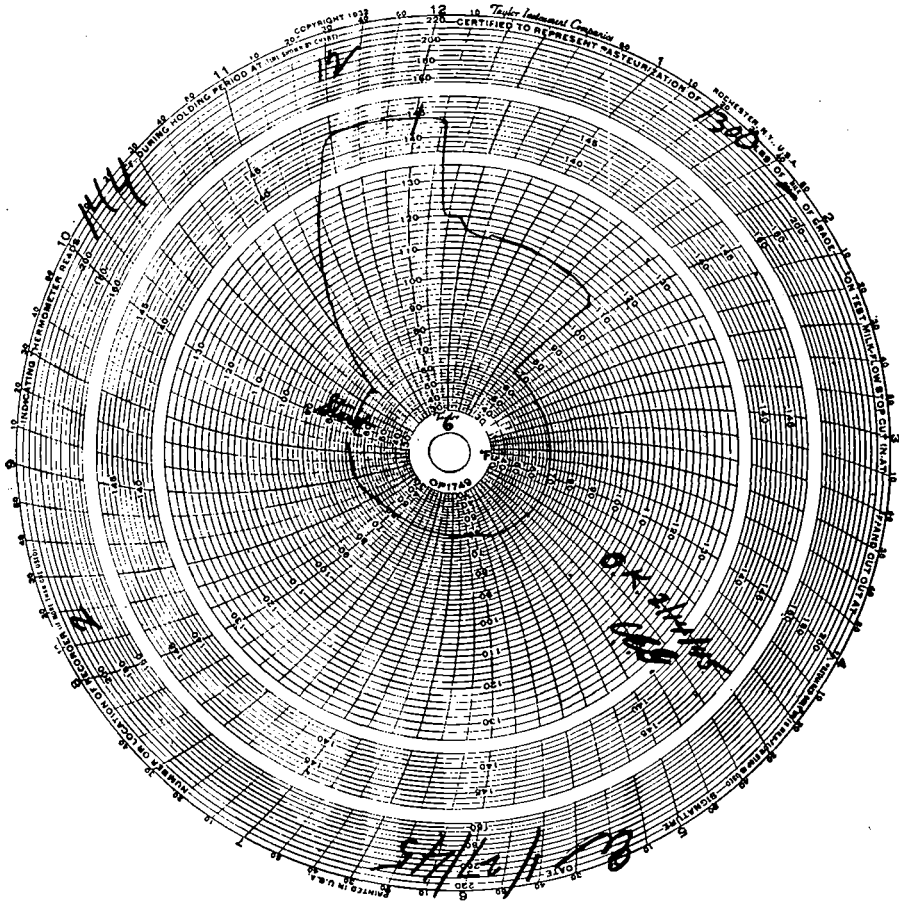


CHART VI

Chart No. 6. Proper Chart—This chart was properly maintained and has all the information needed. It does have the following:

- (a) Correct starting time of operation and date.
- (b) Accurate line record of complete processing.
- (c) Indication that the thermometer was checked at 12:00 o'clock and that the indicating and recording thermometer checked at 144 degrees Fahrenheit during this holding period.
- (d) The volume milk processed is noted.
- (e) The initials of the operator have been placed on the chart.
- (f) The notation that this chart is a record of the processing in vat No. 2 is also made.
- (g) There is also a notation that the inspector looked at the record and okayed it on 2/14/45.

All necessary information is available and the record is of full value to the plant operator and to the inspector.

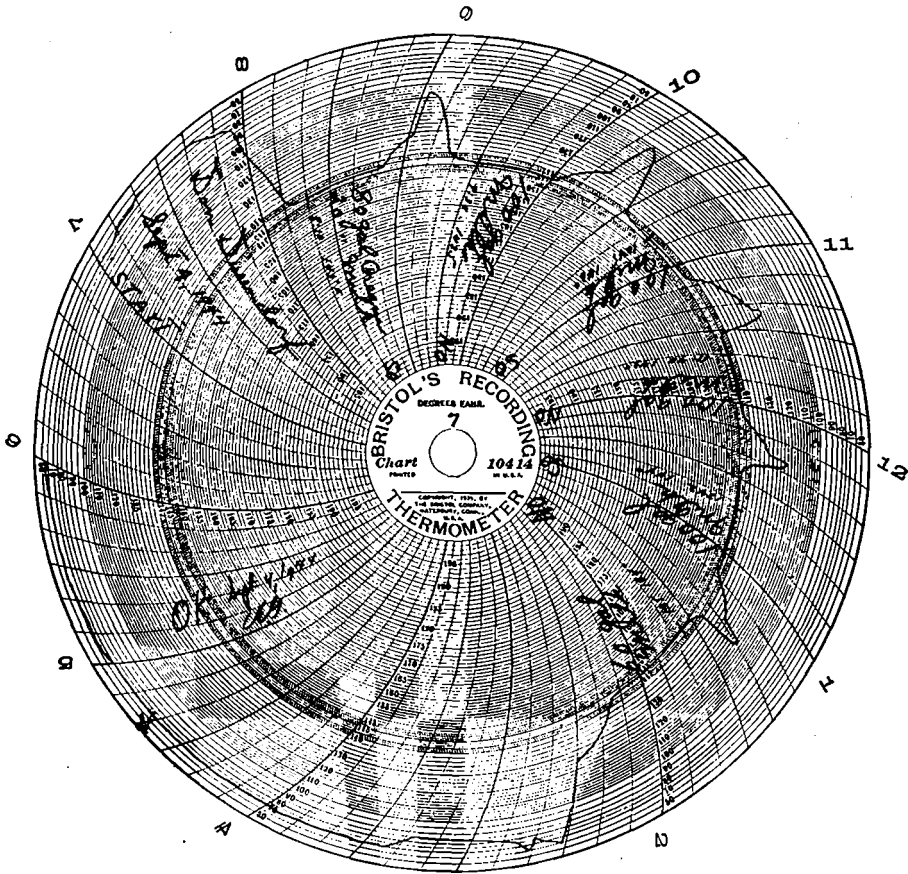


CHART VII

Chart No. 7. Proper Chart— This chart also gives all the information needed for the proper interpretation of the chart. This chart does, however, maintain a record on two pasteurization vats instead of the usual one. In this case, there are two vats, namely, the north vat and south vat. The recording chart shows that the recording thermometer was in the vats of milk being pasteurized throughout the pasteurization process.

After having studied these charts it is plain to see that they must be complete and accurate if they are to be of any value. It is also evident that the maintenance of a proper chart is relatively simple and that there can be no excuse for improper charts. Before closing we will list a few advantages

of having a properly maintained chart:

1. The plant operator will be assured that his recorder chart is in full compliance with the law.
2. In case of court action involving suits or any other matters, the plant operator can have confidence that he has a complete record and can in detail explain the operations that occurred in any pasteurization vat at any time during any day.
3. In case laboratory examinations of the milk show high bacterial counts or positive phosphatase tests, the recorder charts can be of material assistance in locating the trouble.
4. It is good business to have accurate and complete records.