matocrit to that displayed by the Coulter counter is shown in Figure 3. The standard deviation of the difference was 1.7 divisions. Seventy-four of the hundred observations agreed within two divisions and all but four agreed within three divisions. Of these four, the observations were repeated on only two and, as mentioned earlier, the results of the microhaematocrit reading were incorrect in the first instance.

CONCLUSIONS

During the period of use we found the most valuable features of the computer attachments were the saving of time normally required to obtain the PCV and MCV, and the knowledge that the computer result of the MCV was independent of errors often associated with two sequential dilution processes. We had previously compared the mean cell volume with the median cell volume derived from the median threshold on a model A cell counter (standard deviation of the difference $3.8 \text{ cu} \cdot \mu$) and the standard deviation of the computer attachment was no different ($SD = 4.1 \text{ cu} \cdot \mu$). However, unlike previous experience in comparing the median and mean cell volumes, there were no examples of consistent differences between the two methods of computing the MCV and it seems probable that the difference is almost wholly due to errors in reading the microhaematocrit and preparing two sequential dilutions for the red cell count.

The PCV recorded by the Coulter attachment is, of course, dilution dependent, but the errors associated do not seem any greater than those of reading a microhaematocrit.

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Electrically-heated inoculating loop

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Many anaerobic bacteria are sensitive to oxygen and the use of an anaerobic cabinet for handling the specimens is almost essential if all the anaerobic bacteria in a specimen are to be isolated (Drasar, 1967). The cabinet used here is filled with nitrogen so that a gas burner cannot be employed for sterilizing the bacteriological loop. An electrically heated loop was therefore developed and, though this was devised for anaerobic work, it seems to have wider applications.

THE LOOP

The loop is a cautery burner (Allen and Hanburys Ltd. No. 3, type A) mounted in an insulated holder moulded from silicone rubber (Fig. 1); it is connected to a power supply by either insulated braid, permanently attached to the copper handle (Fig. 1), or plugs and sockets. Since for some applications, the platinum tip of a standard cautery burner is too short, a loop with a longer ($1\frac{1}{2}$ in.) tip has been developed.

ELECTRICAL CIRCUIT

The loop is heated by the power obtained from the secondary of a tapped transformer; an ac current meter, a 1 ohm resistance and a fuse, all in series with the loop, complete the secondary circuit. The apparatus also contains appropriate warning lights and a simple control device that automatically switches off the power at the end of a predetermined, but variable, time: the operator has only to initiate the process by momentarily pressing

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FIG. 1. Top. The complete loop in its moulded holder. Bottom. A standard cautery burner, with insulated braid permanently attached, before the moulding procedure.

a switch. Any significant variations in current, due to ageing of the loop or variations between different loops, may be corrected by altering the tap on the transformer; 1 V steps to a maximum of 10 V are adequate.

In some circumstances it may be desirable to have two loops available; adequate safeguards against an operator accidentally using a loop that is being heated would have to be incorporated.

For experimental purposes a variable transformer (Claude Lyons Variac type 80A—S.26, 0.15 V, 13.3 A) was used instead of the tapped transformer.

In this arrangement the transformer output voltage could be increased until the required current as measured on the ammeter was passing through the loop. It is possible with this arrangement to exceed the maximum current rating of the Variac and also the current required to get the loop red hot so that if adopted for prolonged use it would be necessary to provide a physical stop on the brush of the Variac.

METHODS

The current required to sterilize the loop was determined as follows. A current of 9.0 A was passed through the loop, causing it to glow red hot. The current was switched off and the loop allowed to cool. When cool the loop was contaminated either by dipping it into a broth culture or by picking a colony from a plate. A selected current was then passed through the loop for five seconds. After cooling, the burner was rubbed over the surface of a fresh plate and dipped into a fresh broth; care was taken that only the tip of the loop was contaminated. In a further series of investigations the joint between the platinum tip and copper handle was contaminated by dipping into a broth culture and the current necessary to sterilize the joint was determined.

The test organisms used were *Escherichia coli*, *Staphylococcus aureus*, and *Bacillus stearothermophilus*. The *E. coli* and *S. aureus* were grown on blood agar plates. The *B. stearothermophilus* was grown in tryptone soy broth.

The time required to sterilize the loop was determined by picking a colony of *S. aureus*, a selected current being then passed through the loop for a selected time, the loop was then rubbed over the surface of a fresh plate.

RESULTS

The exact current required to sterilize the loop varied (Tables I and II), *E. coli* being more readily killed than *S. aureus* or *B. stearothermophilus* and additional

variation certainly being introduced by differences in the degree of contamination of the loop. A current of 6.0 A for five seconds was usually adequate to sterilize the loop and a current of 6.5 A for five seconds has been adopted for routine use. In a further series of tests it was found that to sterilize the copper-platinum joint a current of 9.0 A for five seconds was necessary. Similar results were obtained with both the long and the short loops.

TABLE I

STERILIZATION OF CONTAMINATED LOOP BY VARYING
CURRENT PASSED FOR FIVE SECONDS
Number of Failures in 25 Tests

Current Passed (amps)	<i>Escherichia coli</i>	<i>Staphylococcus aureus</i>	<i>Bacillus stearo- thermophilus</i>
1	25	25	25
2	25	25	25
3	11	20	25
4	14	15	16
5	0	5	9
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	0	0	0

TABLE II

STERILIZATION OF CONTAMINATED LOOP AFTER
VARIOUS TIMES OF HEATING
Number of Failures in 10 tests

Time in Seconds	4 Amps	5 Amps	6 Amps
3	10	3	0
4	7	1	1
5	4	1	0
6	0	1	0
7	0	0	1
8	0	0	0
9	0	0	0
10	0	0	0
11	0	0	0
12	0	0	0

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