The results are shown in fig. 4 and 5, where the conductivities are plotted against the distance between the explosive and the electrodes. The conductivity always decreased as this distance increased, because the shock waves became attenuated by heat losses and release waves: for instant, the conditions behind a shock which had travelled 3 mm into water were: $P = 127{,}000$ atm, $T = 1045°K$, $V = 0.58$ $cm^3\ g^{-1}$, whereas at 17 mm they were: $P = 33{,}000$ atm, $T = 431°K$, $V = 0{\cdot}71$ $cm^3\ g^{-1}$ (see part 5 [1]). The corresponding values of P, T and V for the other liquids are not known, although it appears that the initial pressures (table 2) were much the same for all the liquids. On the other hand, the experiments of Schall and Thomer [9] and of Walsh and Rice [4] suggest that the compressions V_P/V_0 of the liquids may have been quite different and it is probable that their temperatures were also different.

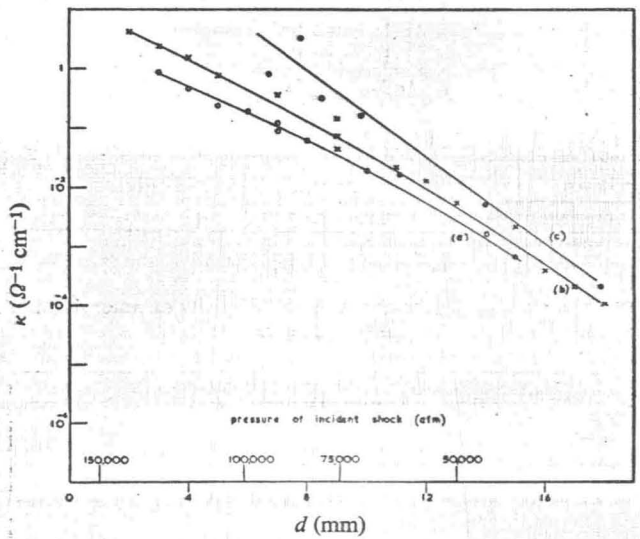

FIG. 5.—The conductivity of water in (*a*) single shocks, (*b*) reflected shocks, (*c*) colliding shocks. The initial temperatures and pressures were about 30°C and 1 atm. The distances d were measured: (*a*) between the explosive and the top of the electrodes, (*b*) between the explosive and the electrode faces, (*c*) between each explosive charge and the centre of the electrodes (see fig. 1).

Glycerol and acetone gave no signs of high conductivity. But ethyl alcohol sometimes gave weak current pulses which were prolonged and quite unlike the usual sharp pulses given by the conducting liquids. These pulses began long before the shock waves could have reached the electrodes, and they may have been due to photoconduction caused by the explosive flash.

DISCUSSION

In part 5 [1] we ascribed the high shock conductivity of water to a very large increase in its self-ionization constant K_{auto}, brought about by the high pressure and temperature behind the shock front. It is likely that the same explanation applies to the other liquids which showed high conductivities in the present experiments. It is significant that their conductivities, at any particular distance from the explosive, decreased in the order:

acetic acid > water > propionic acid > 1 : 1 (vol.) water/ethyl alcohol > methyl alcohol