

As the passage of electricity from mercury to sulphuric acid, or *vice versa*, involves the decomposition of the sulphuric acid, which cannot be effected with less than about 2 volts, the surface of separation between mercury and electrolyte under the conditions of the experiment (E.M.F. less than 2 volts being made use of) acts the part of a dielectric, and the charges produced by the (individual) E.M.F. between the mercury and the sulphuric acid collect on the two sides of the meniscus, as in the case of an ordinary electrostatic condenser. The presence of this charge tends to increase the surface of the mercury, *i.e.*, decreases the observed surface tension (*cf.* theory of gold leaf electroscope), and a removal of the charge by means of an external E.M.F. of opposite sign and equal intensity will cause the apparent surface tension to reach a maximum. The observed value 0.97 volt is then the positive potential assumed by mercury in contact with sulphuric acid of the strength employed. Similar measurements with hydrochloric acid as the electrolyte give +0.560 for the potential of mercury against a solution of 36.5 grammes HCl in a litre of water.

If v. Helmholtz's theory of these electro-capillary phenomena be accepted, it furnishes the first individual E.M.F. between a metal and an electrolyte; the E.M.F. of other metals *in contact with normal solution of their salts* (calculated as indicated on page 247) are given in the following table (for a temp. of 15° C.):

Table 4.*

Magnesium	—1.22 Volt
Zinc	—0.51
Aluminium	—0.22
Cadmium	—0.19
Iron	—0.06
Lead	+0.10
Copper	+0.60
Mercury	+0.99
Silver	+1.01

The accurate determination of these values (those given in the table have a probable error of about one or two hundredths of a volt) is of the same importance to electrochemistry as is the determination of the atomic weights to analytical chemistry; the table itself is the modern quantitative form of the old "Electrochemical Series" of Volta.

*Ostwald. Lehrbuch, II., 946, 1893.