The aim of this work was to determine the stability constants of the complexes of lead with the ligands; chloride ($Cl^-$), fluoride ($F^-$), Carbonate ($CO_3^{2-}$), bicarbonate ($HCO^-_3$), and hydoxide ($OH^-$) and lakewater. The water was obtained form lake Elmenteita in the Rift Valley province of Kenya. The lake is situated about 160 km from Nairobi. It is highly alkaline.

The stability constants were determined in two types of media; in actual lakewater, and in aqueous solutions at the ionic strength of the lakewater. The ionic strength in the aqueous medium was maintained with sodium perchlorate. The stability constants were determined by two methods; Differential pulse polarography (DPP) and differential pulse anodic strapping voltammetry (DPASV). The stability constants were determined at two lead concentrations, $10^{-4}M$ and $4.83 \times 10^{-6}M$. DPASV was used only at the higher concentration ($10^{-4}M$).

It was found that at low pH values, Chloro and Fluoro complexes contribute much to the complexation of lead, but at the naturally high pH value of this lake these two complexes are of minor importance in the speciation of lead. The bulk of the lead being present as the carbonato, bicarbonato and hydroxo complexes.

The high carbonate level in the lake was found to be the cause of the low levels of metal ions in this lake. This is due to precipitation as the carbonates. The most abundant lead complexes being;

$p_bCO_3^\circ$     $K = (9.83 \pm 4.73) \times 10^5$

$p_b(CO3)_2^{2-}$  $K = (1.66 \pm 1.17) \times 10^8$

$PbHCO^+_3$   $K = (4.58 \pm 1.20) \times 10^5$

$Pb(HCO_3)^\circ_2$  $K = (1.92 \pm 0.77) \times 10^6$

$PbH^+$       $K = (9.03 \pm 0.82) \times 10^7$

$Ph(OH)_2^\circ$    $K = (2.37 \pm 1.16) \times 10^9$

A number of differences between the actual lakewater and the aqueous media at the ionic strength of the lakewater were noted. The number of complexed species detected were different, and the stability constants calculated differed.

The number of hydroxo complexes detected in the aqueous media were three viz $PbOH^+$, $Pb(OH)_2^\circ$ and $Pb(OH)_3^-$ while only two were detected in lakewater. Their stability constants also differed quite significantly.

Four Chloro complexes were detected in lakewater, viz $Pb_{Cl}^+, PbCl_2^\circ, PbCl_3^-, PbCl_4^=$, only three were detected in the aqueous media.

It was found that lead would exist more as the carbonato, bicarbonato and hydroxo complexes in lake Elmenteita.  The chloro and fluoro complexes are insignificant to the complexation of lead at the pH of the lake