

350 to 450 C.), about 75 to 90 per cent. of the hydrochloric acid is said to be decomposed with the liberation of chlorine. Modern electrolytic processes for the production of chlorine make this useless.

*Electric Batteries.* Several of these rare-earths, especially those of the cerite group, form a variety of oxides, as  $\text{CeO}$ ,  $\text{CeO}_2$ ,  $\text{Ce}_2\text{O}_3$ ,  $\text{Pr}_2\text{O}_3$ ,  $\text{Pr}_4\text{O}_7$ ,  $\text{Pr}_2\text{O}_5$ , etc. The construction of a storage battery, devised by Welsbach, depends upon the electromotive behavior of the cerium oxides. The electromotive force of a reversible battery (consisting of zinc amalgam, zinc sulphate, cerous-cerie sulphate, carbon) is said to exceed that of the lead accumulator, although it is doubtful if this cell can compete with the lead cell in its results. The cerium-zinc-sulphate electrolyte, which may be regenerated, can be used advantageously as a substitute for the chromic acid solution in the immersion battery. According to Baner and Glaessner, there is no hope of practically producing cells from aqueous solutions of cerium salts. This does not, however, preclude the use of cerium oxides as catalyzers in cells with fused electrolytes. If the public press accounts of the Edison cells are correct, this can have no value.

*General.* In recent years Muthman and his co-workers have investigated exhaustively the utilization of the metals of the rare earths. The metals were obtained by electrolyzing fused chlorides in copper crucibles, water-jacketed, with carbon electrodes. The cerium thus obtained gives brilliant sparks when scratched with steel. The pyrophoric bodies thus produced, as well as those alloys of Welsbach, which possess a similar property, have so far not been put to any extensive use that is well known. However, Escales has secured a patent for the production of lighting masses, based upon the reduction by means of magnesium and aluminium. He, also, patented a process for obtaining metalloids or alloys of the rare earths, which are said to possess even greater reducing powers than aluminium itself.

Siemens and Halske secured patents for the production of electrically incandescant bodies from the rare earths. Sander produced on conductors of the second class metallic films or crusts. This was accomplished by the reduction of the oxides or other compounds of the rare earths by means of potassium, sodium, or magnesium in a vacuum, or in the atmosphere of an indifferent gas.