

cholesteryl chloride is reduced to α -cholesteryl chloride and this is hydrolyzed it gives epi-cholestanol. In the preparation of cholesteryl chloride and its hydrolysis there is no Walden inversion in the final product, but when this is reduced and then hydrolyzed a Walden inversion occurs in one of the steps.

When α -cholesteryl chloride is oxidized, α -chloroandrosterone is formed which is identical with the product produced by Butenandt and Dannenbaum [*Z. physiol. Chem.*, **229**, 192 (1934)] by the reduction of an unsaturated chloroketone isolated from urine. This α -chloroandrosterone when hydrolyzed with potassium acetate gives androsterone. This work was completed several months ago, but since Ruzicka and co-workers [*Helv. Chim. Acta*, **18**, 998 (1935)] have recently prepared α -chloroandrosterone from epi-cholestanol, it was thought advisable to publish our results in brief form since the new method possesses distinct practical advantages for producing androsterone. The experimental work and androsterone derivatives and their physiological properties will be reported in THIS JOURNAL at a later date.

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RECEIVED JULY 30, 1935

THE SEPARATION OF EUROPIUM FROM OTHER RARE EARTHS

Sir:

The writer has lately isolated considerable quantities of quite pure europium by a process which seems to be simpler than any heretofore

described. He has found that if 2 or 3 ml. of a rather concentrated solution of rare earth chlorides is stirred with a pinch of zinc dust it will bleach a piece of blue litmus paper; instantly if much europium is present and definitely if even a small fraction of one per cent. of the rare earths is europium. The bleaching is caused by the europous chloride, EuCl_2 , formed by the action of zinc on the trichloride.

This reaction serves not only for the detection of europium but leads to a simple and rapid means of separating europium from the accompanying rare earths. If a rather concentrated solution of the chlorides of the rare earths, acidulated with a little acetic acid, is run through a column of amalgamated zinc, substantially in the form of a Jones reductor such as is used in the analysis of iron, practically complete reduction of the europium present takes place.

The writer has used a 30-cm. column of twenty to thirty mesh zinc in a tube 1.7 cm. in diameter. The reduced solution was run into a bottle containing a solution of magnesium sulfate with an atmosphere of carbon dioxide present to prevent oxidation by air. The europous sulfate thus obtained is a white microcrystalline precipitate of a high degree of purity. One or two repetitions of the reduction and precipitation by the same process frees the europium from all traces of the other rare earths.

A quantitative determination of europium is easily made by running a reduced solution into a small excess of standard iodine solution and titrating the excess iodine with thiosulfate.

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RECEIVED AUGUST 15, 1935