A Banach space with a non-complemented closed subspace.

 c_{\circ} is a non-complemented closed subspace of $l^{\infty}.$

(cf. [R.S. Philips, On linear transformations, Trans Amer Math. Soc. 48 (1940), 516-554.])

Newmann and Rudin gave another example, i.e. the subspace of $\mathcal{C}(T)$ consisting of the boundary values of analytic functions.

(cf. [K. Hofman, Banach spaces of analytic functions, Prentice-Hall, Englewood Cliffs, N.J. 1962.])