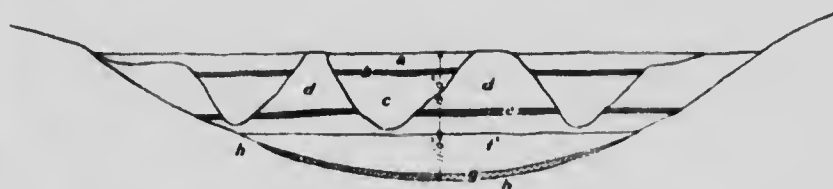


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The company controlling the deposits at Clinton has opened very similar deposits at Kruger mountain on the International Boundary near Oroville. These deposits were probably formed in the same manner as those at Clinton. According to Jenkins<sup>1</sup> there are, near Oroville, two landlocked lakes containing brines and beds of epsomite. The lakes are in rock basins without outlet; the surrounding rocks are metamorphosed pyritiferous dolomites and shales. Figure 10 is a cross-section of the lake drawn according to information furnished by F. Culvert. In this figure, layers "a" and "c" are cone-shaped bodies of epsomite with a thin layer of mud, "b." Layer "d" is of black mud carrying 25 per cent of epsomite with a layer of leaves "e." Layer "f" is a bed of epsomite with very large crystals. Layer "g" is a thin layer of gypsum underlain by a thin bed of clay resting on "h," metamorphosed dolomites and shales. The surface of the salt in "a" is lower than the top of "d."



a and c Epsomite with mud layer b; d Mud with layer of leaves e; f Epsomite  
g Gypsum over clay, h Metamorphosed dolomite, etc

Figure 10. Cross-section of Bitter lake, Kruger mountain, Washington, U.S.A.

Jenkins states that the drainage basin of the smaller lake is less than one-half a square mile in area. Sulphated waters formed by the oxidation of pyrite occurring in the surrounding rocks are presumed to have dissolved magnesium from the dolomites. Jenkins believes that the cone-shaped masses of salt in the upper part of the deposit were formed by crystallization of solutions percolating upward and that the force of the growing crystals helped to open up a space in the mud, thus forming a deposit which grew upward with increasing width until the surface was reached. Objections to this hypothesis are that a mass of salt forcing its way to the surface by crystal growth would form a body with a convex or irregular rather than flat upper surface. The flatness of the upper surfaces of the inverted cones at Kruger mountain and the fact that the materials composing the cones is comparatively free from the impurities that form small ridges all around them, suggest that the bodies were formed in the following manner.

It is well known that there are cyclic changes of climate in which conditions change from arid to moist and back to arid. It may be supposed that after the formation of the rock basin by glaciers, there was a period of aridity during which a certain amount of magnesium sulphate in solution collected in the bottom of the basin, probably mainly through underground channels. In this solution were also sodium and calcium. Evaporation and consequent concentration caused the formation of the lower bed. A succeeding cycle of greater rainfall gave rise to surface streams which

<sup>1</sup>Jenkins, Olaf P., "Spotted lakes of epsomite in Washington and British Columbia." Am. Jour. Sci., vol. XLVI, Nov., 1918, pp. 638-644.