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ANALYTICAL CHALLENGE

Solution to geometric chemistry challenge

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Figure 1 depicts the stepwise formation of three manganese oxides from metallic manganese and oxygen. In this rare geometrical rendering of a chemical reaction, the reactants are depicted as rectangles whose areas add up to the product rectangle area. For example, in a reaction between "MnO" and "O", the areas of MnO (Manganoxydul) and O (Sauerstoff) add up to the area of the MnO_2 (Manganhyperoxyd). Figure 1 is the dissection of the original scheme [1] showing the geometrical representation of *three* reactions:

$Mn+O \rightarrow MnO$ (Mangan+Sauerstoff → Manganoxydul)
$MnO+O \rightarrow MnO_2$ (Manganoxydul+Sauerstoff → Manganhyperoxyd)
$MnO_2+O \rightarrow MnO_3$ (Manganhyperoxyd+Sauerstoff → Mangansäure)

Note that most chemists of this period believed that the pure elements, such as oxygen, were inherently monoatomic until 1858 when Stanislao Cannizzaro showed that elements such as hydrogen, nitrogen, and oxygen are in fact diatomic.

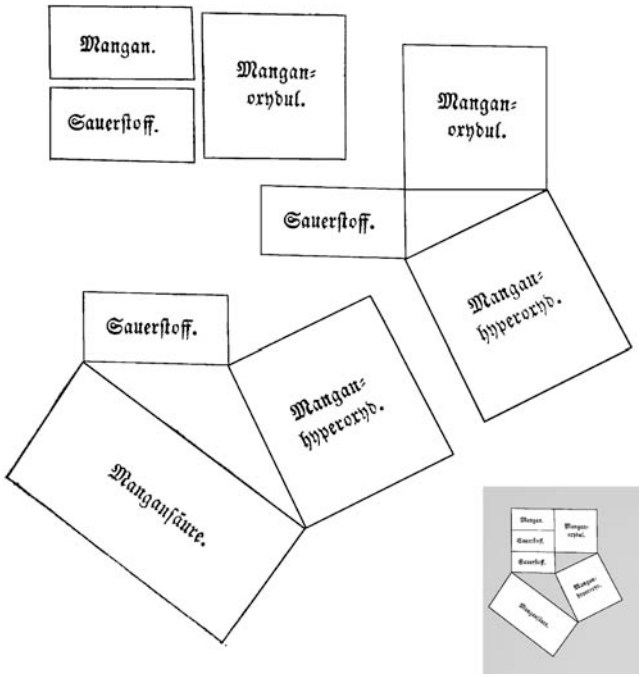

Fig. 1 A chemical diagram depicting the stepwise formation of MnO_3. Modified from [2]. Oesper History of Chemistry Collections (University of Cincinnati, Department of Chemistry)

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