

## THE CHEMISTRY OF WEED-KILLERS.

(Continued from February Issue.)

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### Dangers of Sodium Chlorate.

COMMERCIAL sodium chlorate ( $\text{NaClO}_3$ ) consists of small white crystals which resemble those of common salt (sodium chloride,  $\text{NaCl}$ ). The names of these two compounds are similar, but their properties are very different, and of course they are used for entirely different purposes.

Sodium chlorate has in recent years come on to the market as a weed-killer, and has been distributed in relatively large quantities in countries where intensive agriculture is practised. To those who have passed through a chemical course of training the more familiar salt is potassium chlorate, with which students delight to demonstrate the nature of an explosion by gently rubbing the chlorate with sulphur, when the two substances combine under pressure between pestle and mortar, resulting in a series of sharp reports.

Sodium chlorate is superior to potassium chlorate in two important respects, being much more soluble in water and therefore more easily made into a solution, and containing more oxygen. Potassium chlorate is superior to sodium chlorate in supplying a plant-food potassium, one of the three essential fertilizer ingredients recognized by the New Zealand Fertilizers Act.

The properties of these two compounds may be compared as follows:—

Name.	Formula.	Percentage Composition.	Solubility in 100 Parts Cold Water.	Percentages of available Oxygen.
Potassium chlorate	$\text{KClO}_3$	Per Cent. K, 32 Cl, 29 O, 39	6	39
Sodium chlorate ..	$\text{NaClO}_3$	Na, 21.6 Cl, 33.3 O, 45	94	45

The chlorates are made by the action of chlorine on caustic soda or caustic potash. Hence the raw materials are not available from New Zealand sources at present, and the sodium chlorate all has to be imported, Germany, the United States, Sweden, and France being some of the exporting countries. An impure calcium chlorate is on the market as a weed-killer under various names, but it is so diluted with the by-products of manufacture that it cannot be considered in comparison with the potassium and sodium salts.

The dangers attending the use of sodium chlorate are intensified by the novelty of the compound's characters to the farmer. That