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The First Generation

WITH the present year the first generation of the twentieth century will have passed into history, and it has therefore seemed to us worth while to offer the results of a little stock-taking in this issue of INDUSTRIAL AND ENGINEERING CHEMISTRY. This we have endeavored to do through a group of special articles in which will be found discussed the best practice now prevailing in the design and construction of certain chemical equipment. The story is by no means complete, and in subsequent issues we plan to present additional discussions along the same line. Here and there will be found reference to difficulties still to be overcome by the equipment manufacturer to meet the specifications of the chemical and allied industries. Also trends are indicated which may suggest to those in research and development work fruitful lines for their investigation.

It is rather fascinating to think over and note what has been accomplished in chemistry and the chemical industry since so recent a date as 1900. Commercial achievements based upon research conducted within that time comprise a list startling in its magnitude and significance, and encouraging as indicating how the possibilities unfold as our stock of truth accumulates. The influence upon our habits of thinking is undisputed and the next generation will see many things accomplished which even the present has hesitated to undertake, deterred by the apparent impossibility of success.

Responsibility for Hazards

THE effort to have the duty on sodium chlorate removed on the ground that it is useful and effective in destroying harmful weeds on the farms has brought to our attention a situation which borders on the appalling, when one considers the hazards involved in the use of this material and the responsibility of those who have urged it upon men not technically trained. It is not surprising that tariff revision for agricultural benefit should be made the occasion to seek the removal of duty on this material, but it seems to us that these are unrelated matters. Sodium chlorate, among other materials for weed eradication, has been used with considerable success on railroad rights of way, but here methods of applying the material can be standardized and carried out under the supervision of those who know the hazards with which they are dealing and can take suitable precautions. But think of the potential menace to life and property when an open keg or drum of chlorate is stored in the old barn, where it may readily come in contact with organic dusts. Think of the hazards that remain after its use, even though the exceptional farmer may have taken the trouble to read the warning label on the container.

There is no difficulty in storing sodium chlorate safely under standardized conditions, and warehouses have no trouble about insurance, for they know what precautions

should be taken. But it seems to us that all of this changes when the package is opened on the farm.

We are informed that many thousands of dollars of damage have already resulted from the use of this chemical in the fields. In one instance, a few days after the application of sodium chlorate a man was walking through the area that had been sprayed. The sun was hot, the plot was dry, and suddenly the man found himself on a bed of fire. Luckily he lost no more than the cuffs of his trousers. The same day the vehicle that had been used to carry the solution and spraying equipment was being driven along a road. The men on the wagon were startled to find the rear end on fire, probably caused by the intense heat of the sun or the jar and friction on the wagon boards where the sodium chlorate had dried in the wood. There have been other cases where the chemical dried on the clothing of those applying it and later burst into flame, causing serious burns. Buildings have been destroyed by fire apparently resulting where the solution dried or where dusts accumulated with the chlorate.

Sodium chlorate, may we reiterate, packed according to standard practice in metal containers, is safe as long as it remains in those containers, and of itself is not dangerous, inflammable, or explosive. It acquires these undesirable characteristics so far as the farm is concerned when mixed with organic or other combustible matter, and every precaution has to be taken, therefore, to prevent such admixture.

In view of these well-known facts, it seems to us exceedingly strange that some agronomists, county agents, and experiment station men should have shared in the responsibility of advocating the use of so hazardous a material in the hands of inexperienced operators. Labels may give legal protection, but there is an abundance of proof that "caution," "warning," "poison," and other sorts of labels are seldom carefully read, and sometimes the truth of their statements is not appreciated. Methanol affords another example.

An incidental objection to sodium chlorate on the farm arises from the probable decomposition of that salt into its equivalent of harmful sodium chloride. A quantity of chlorate sufficient to kill prevailing weeds thus would ruin some soils in the dry farming region. This menace is, of course, insignificant as compared with the more serious one—danger to both life and property in the storage of chlorate in open containers, where dust and other combustible matter may easily come in contact with it.

By all means let us do our utmost to overcome weeds. We can begin with clean seeds and an educational campaign to convince the farmer how much he loses if weeds are allowed to flourish. But let us not destroy the farm and burn down its buildings, thereby emulating those who would burn down the house to destroy the rats. Our friends who are advising agricultural folk can always without great difficulty obtain the advice and coöperation of their colleagues in chemistry. Such contacts will greatly further the desirable application of chemistry to farm work and eliminate unnecessary hazards.