Chapter 5

Sulfur Requirements of the Phosphate Fertilizer Industry

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I. INTRODUCTION

Sulfur and sulfuric acid have been closely associated with the phosphate fertilizer industry from its inception. They have grown up and matured together since that day back in 1840 when Justus von Liebig recommended that plant nutrients be added to the soil and demonstrated that the value of bones, as fertilizer, could be increased by treatment with sulfuric acid. About the same time, G. B. Lawes, working independently, applied the same treatment to bones and shortly thereafter to a Ca phosphate mineral which was discovered about that time. In his barn at Rothamsted, the first "superphosphate" factory was established in 1843.

The history of the industry is a fascinating story which has been told better and at greater length elsewhere. The association of P and S has continued, however, and we must now look at today's situation and then attempt to see what form it may take in the future.

In Fig. 1, world consumption of fertilizer P and consumption of S used to make P fertilizers are compared for the years 1950–1973 and estimated for 1980 and 1985. The close relationship between the use of the two materials is readily apparent. Similarly, the increasing ratio of S to P is illustrated, brought about by the emergence of ammonium phosphates which use wet process phosphoric acid as the sole source of P in their manufacture.

II. STATISTICS ON PAST AND PRESENT USE

A. Sulfur Use in Phosphate Fertilizers by Type

Most P fertilizers consume S at some stage of their manufacture, although there are only two products which may be said to be basic consumers—ordinary superphosphate (OSP) and wet process phosphoric acid (WPPA, Fig. 2).