THE need for chemical nitrogen in rice production was probably never more acute throughout the world than today. Hunger and starvation are rampant among great masses of peoples many of whom are in rice-growing sections. In the oriental countries, in particular, there is insistent demand for industrial construction, including mechanical equipment for nitrogen fixation. It is not always known what form of nitrogen is best suited to local conditions from the combined industrial and agricultural standpoints. Similar problems face Americans who export nitrogen for rice culture and those who are responsible for allocation of shipments of these products. It is particularly desirable at this time to examine the scant agronomic data that have been published on the problem of the less conventional forms of nitrogen fertilizers for rice.

Ammonium sulfate is the standard mineral nitrogen fertilizer for lowland (irrigated) rice. It is used in nearly all parts of the world where it is available. Other nitrogen carriers, such as nitrates, urea, cyanamid, and organics, are also used, frequently with inferior results, but sometimes they give better crop yields than does ammonium sulfate.

Studies have indicated that the lowland rice plant utilizes ammonia nitrogen more effectively than nitrate nitrogen. The work of Nagoaka in Japan (11), Trelease and Paulina in the Philippines (17), and Kelley in Hawaii (7, 8) is essentially in accord in indicating superiority of ammonia nitrogen over the nitrate form. Frequently, however, results in both pot and in field experiments have been out of harmony with this general rule. This is to be expected for hundred of varieties of rice are grown on more than 200 million acres, under varied soil and climatic conditions and by numerous cultural and irrigation practices. The efficiency of nitrate nitrogen is frequently rated at about 65 as compared to the ammonia form taken as 100. Experiments conducted in water and sand cultures indicate that the rice plant can utilize either form of nitrogen, but that the ammonia form is taken up more readily. After any form of nitrogen, including nitrate, becomes a part of the plant tissues, it is retained readily.

Urea, or ammonium nitrate, frequently can be produced more economically than can ammonium sulfate, due to varying natural resources particularly a cheap supply of sulphuric acid or calcium sulfate. The purpose of the present paper is to examine experimental