**Several years ago this editor read an article published in a book "Taking Nitrogen from the Air". It has been condensed to read as the following. I wonder if a project such as this is still in use.**

## TAKING NITROGEN FROM THE AIR FOR FERTILIZER PURPOSE

One of the greatest discoveries is the fixation of nitrogen from the air for fertilizer purposes. As most of us know, the most important plant food is nitrogen.

While the earth is literally bathed in nitrogen this element is found to only a very slight degree in the soil. That is to say the air which we breathe and in which we move is four-fifths nitrogen. Yet in the richest soil there is seldom more than one-tenth or two-tenths of one percent of nitrogen.

For years some of the greatest scientists ambition was to discover how to make the supplies of nitrogen in the air available to plants as food. The only way this could be done in nature was through the bacteria working on the roots of certain plants such as clover, but this was entirely too slow for practical purposes.

Later a discovery was made that a compound of calcium and carbon heated to a high temperature would absorb nitrogen and retain it in a form that could be applied to the soil and serve as a food for plants.

Besides air this process required as raw materials, limestone and coke. The limestone must be burned to quicklime and the quicklime and coke must be fused together to form calcium carbide. Only the most powerful electric furnaces are capable of performing this work. In these furnaces the lime is heated so powerfully that it actually melts to a liquid and in this condition it dissolves the coke with which it is mixed, and the compound resulting is calcium carbide which can be run off from the interior of the furnace in liquid form.

At one of these cyanamid plants there are seven of these great carbide furnaces each about fifteen feet long and half as wide and one-third as deep. In these furnaces the heat is so terrific that when the fused lime and coke come out in the form of molten carbide the brightness is so dazzling that one can not look at it with the naked eye without injury.

Then there is the problem of producing pure nitrogen gas, that is, separating the eightly percent of nitrogen in the air from the twenty percent of oxygen. The latter is the element which we breathe and which passes into the body.

If the nitrogen and the oxygen were both allowed to act upon calcium carbide the oxygen would burn up the carbide before the nitrogen could be fixed in it. So these elements must be separated and all other impurities removed so that only chemically pure nitrogen is brought to the calcium carbide for fixation. The separation is accomplished by means of liquid air machines. This industry therefore not only utilizes the greatest heat obtainable on a practical scale, but it also utilizes the greatest cold. While the electric furnace produde a temperature of over 4000°F., or about twice as hot as molten cast iron, the liquid air machines work at a temperature of 372°F. below zero. The air must first be purified and dried. It is then compressed cooled while under pressure and then expanded. The expansion lowers its temperature considerably whenever this 372°F. below zero is reached the air liquifies.

When the liquid air is allowed to warm up a little the nitrogen gas evaporates while the oxygen remains behind in the liquid. The pure nitrogen then can be pumped into the fixation ovens.

To fix the nitrogen in the carbide it is necessary to cool the latter after it comes from the electric furnaces and grind it to a very fine powder. This powder is then placed in furnaces that look like steel barrels but are three or four times larger than the ordinary barrel. The oven filled with calcium carbide is then electrically heated with a carbon rod running through the center. When the temperature is about as hot as that of molten iron the pure nitrogen gas from the liquid air plant is pumped in and allowed to act on the calcium carbide for about a day and a half. When the carbide has absorbed all it will absorb the crude cyanamid formed is removed from the oven as a single large cake which is run through pulverizing drums and then put through an elaborate process of refinement and finally bagged for shipment.