Nitrogen Taken From Air Basis Of New, Widely Used Fertilizer

Chemical Research In Europe 40 Years Ago Started Idea. New Type Fertilizer Useful For Impoverished Soil. Returns Farms To Productivity

By John B. Abbott

NITROGEN FROM THE AIR

The relation between some chemical research in Europe 40 years ago and present land values on the Eastern Shore may not be at once apparent. That relationship, however, does exist and to the very considerable benefit of Eastern Shore farmers.

The chemical research to which reference is made was that of Doctors Frank and Caro, who developed the first commercially successful method of combining the nitrogen of the air chemically with other materials so it could be used as a fertilizer. Its relation to land values, not only on the Eastern Shore, but up and down the entire Atlantic Seaboard, is that the discoveries of Doctors Frank and Caro, and other scientists in later years, made fertilizer nitrogen cheap enough so that it could be used.

Without fertilizer nitrogen ,the lighter types of soil up and down the Atlantic Seaboard would not be productive enough to make it really worthwhile to farm them, and real estate values would be only a fraction of what they are today. So it follows that the chemical research of 40 years ago is directly related to present land values on the Eastern Shore.

A few years ago the writer was privileged to spend a few days with one of the most agricultural scientists now living, Sir John Russell of the Rothamsted Experiment Station in England. Sir John, as well as being a very eminent scientist, is a very sound philosopher. His discussion of the relation of chemical research, particularly nitrogen fixation, to land values, was so clear, logical and sound that I have never forgotten it. His statement, very much condensed, was about as follows:

In the early days of agriculture when farmers had little other than forked sticks or, at most, wooden plows to till the soil with, light, friable, easily-worked soils were valued most highly because they were so easily worked. These soils, however, were subject to one very serious limitation, and that was they wore out after a few years of cropping, so farmers had to abandon them and move on to virgin soil somewhere else.

Later, with the development of better draft animals and iron and steel tillage implements, farmers tended to value deep, heavy clay soils much more highly than the lighter soils which previously they had preferred. This was because the tillage difficulty had been overcome with better implements and power, and the heavier soils contained so much larger supply of fertility, especially nitrogen, that they did not wear out in just a few years. This preference for heavier soils existed all through the later Middle Ages and, in fact, right down to the dawn of the present era of synthetic chemistry. The heavy soils were difficult and refractory to work and became very wet and sticky with too much water, and cake very badly with drought, but they did not wear out, and they did continue to produce crops.

Later, with the development of synthetic chemistry, and particularly since Frank and Caro's development of the Cyanamid Process of fixing nitrogen from the air, farmers have learned how to maintain the fertility of the light, friable ,easily-tilled soil, and because of its ease of tillage and high degree of responsiveness to treatment, have preferred it to the more refractory clays.

All up and down the Atlantic Seaboard, and particularly in the Northeast, there are rather extensive areas of light soil which were farmed for a few years in Colonial days or in the early life of the nation; then abandoned as worn out and not containing fertility enough to grow a crop; and since then, with the aid of chemical fertilizers, reclaimed and restored to a high degree of productivity.

Two things these light soils need more than anything else are first, more nitrogen so that the crop will not starve to death; second, more humus.

There is a direct relationship between nitrogen and humus in that nitrogen is really a part of humus and cannot long exist in the soil in any other form. Nitrogen, in the form of soluble salts, !either is absorbed by plants, leached out in the drainage water, or combined with organic materials in the soil to form humus ,in which form it resists leaching until such time as the humus rots down.

Humus is so important on these light soils on the Eastern Shore that one may always say, "Take care of the humus supply and fertility will take care of itself."

But humus s not a fixed, static sort of thing which can be put in the soil and remain there forever afterward. Instead, it is a dynamic, living, changing thing, renewed by each cover crop or bit of crop waste that is plowed down, and destroyed—or rather broken down into simple plant foods—by soil bacteria.

Sound soil management consists not in trying to build up the supply of humus to some pre-determined high point, but rather in keeping a constant stream of humus-forming materials flowing through the soil and coming out as a profitable crops, just as coal flows through a furnace and comes out as heat or power.

Animal manures, the waste parts of crops, weeds, sods from hay crops and cover crops are the most economical sources of humus. These products are not equally valuable. Those which are rich in nitrogen make humus rapidly and make a desirable type of humus without interfering with the growing of subsequent crops. Those which are not rich in nitrogen go over to the form of humus very slowly, and during the process are likely to deplete the soil of available nitrogen and depress the yield of the crop then growing on the land. Farmers have recognized this difference for many years and have valued those materials which are low in nitrogen so little that oftener than not, they have raked them up and burned them just to be rid of them. That has solved the problem of avoiding the depression of crop yields which often follows plowing such materials down, but at the expense of wasting a good deal of potentially valuable organic matter.

Here, again, that matter of the influence of the research chemist on agriculuture comes in. The lost-cost nitrogen which we owe to the research chemists, such as Frank and Caro, who developed the Cyanamid Process, has made it possible to supplement these low-grade organic materials with commercial nitrogen in the form of Cyanamid, after which they are about as valuable as clover, or vetch itself.

This abundant supply of low-cost nitrogen has done another thing. It has made it possible to give an adequate supply of nitrogen to rye and other covers crops so they could make a real growth and provide something worthwhile to turn under.

Suppose, for example, a man grows a cash crop of some sort with the usual amount of fertilizer, and harvests it in late summer or early fall, and then wishes to follow it wth a winter cover crop. How much chance is there that the winter cover crop will be able to get nitrogen to make a real growth? Very little. What the cash crop has not used up during the summer, the rain has washed out. A small amount of Granular 'Aero' Cyanamid, say as little as 150 pounds per acre, applied broadcast and harrowed in befare the cover crop, in such cases usually doubles the amount of crop to be plowed under the following spring.

We really owe a lot to those research chemists of 40 years ago and their many successors. They have made it possible for us to use land which otherwise would have been worn out and abandoned. They have been directly responsible for the maintenance of productivity of the light, friable, easily-worked soils of the Eastern Shore and all up and down the Atlantic Seaboard. They have conveyed a very real benefit to those farmers who take advantage of it, but they have made life very tough indeed for those farmers who fail to take advantage of it and fail to get satisfactory yields.

EARLY WALK

Comfortable little creatures creep
Into the hedgerows as we pass,
The cricket thrums, and half-asleep
A grasshopper leans on the grass.

The chirring locust starts his din;
Over the pond a dragonfly
Hovers, and from the East a thin
Arrow of gold goes up the sky.

Moving by shadowy fences, cows
Munch and stop and munch again,
Lifting their heads from where they browse
To stare at trespassers in the lane.

Germany will permit wearing of shorts, provided they are given German names.

Commissioner

Alfred M. Green

Member Town Board Operates Electric Store

Alfred M. Green Former World War Aviator, Rotary Ex-President

Secretary of the Centreville Board of Town Commissioners and owner of Green's Electric Store, Alfred M. Green plays prominent parts in both civic and business activities of Centreville.

Born in Centreville, son of Mrs. Alfred M. Green and the late Mr. Green in 1893 he was educated in Centreville high school. Yates School at Lancaster, Pa., and studied engineering at Johns Hopkins University.

When the United States entered the World War Mr. Green enrolled in the U. S. Army Air Corps and reached the rank of first lieutenant. He flew airplanes to Queen Anne's county during the war to aid in Liberty Loan drives, assigned to the task as one of the county's aviators among the budding aces of the Army Air Corps.

Mr. Green's father, the late Al Green, was a Town Commissioner of Centreville for a quarter of a century. Upon the latter's death his son was elected to fill out the unexpired term. Mr. Green is now completing his third elected term of two years each.

In September, 1934 he established Green's Electric Store featuring Westinghouse appliances, Philco radios and Fluid Heat Oil Burners. He is Eastern Shore of Maryland and Delaware distributor for the Fluid Heat burners.

Mr. Green is a former president of the Centreville Rotary Club and is a member of the Chamber of Commerce.

He is married, his wife being the former Winnie Webster. They have one daughter, Miss Patty Green. Mrs. Green is also active in community life and served as president of the Centreville Women's Club for several years.

Butter Production On Sharp Upswing

Ups and downs and geographical shifts in dairy production are reflected in statistics assembled recently by the Bureau of Agircultural Economics. From 1930 to 1933 there was a definite upward swing in butter manufacture. For the next 3 years the trend was as definitely downward. Droughts of 1934 and 1936 were an important factor. A year without much change followed and then a sharp rise between the fall of 1937 and the spring of 1939.

Geographically, too, there have been shifts. Much of the milk in Eastern dairy areas is sold as fluid milk. The leading butter-producing States are Minnesota, Iowa, and Wisconsin. These account for more than a third of all the creamery butter. In the 1930 to 1933 expansion these States lagged. The increase of 12 percent in butter making in the country as a whole included only a 5-percent increase in these three States. But in the expansion of the last 18 months, this area of intensive dairying is keeping pace with the rest of the country.

Ponds Brings Wildlife To Vast Plains Area

Besides supplying needed livestock water properly managed farm ponds often afford a home for wildlife which otherwise could not exist. Where streams and natural lakes are few—such as on the Great Plains—protected water vegetation feeds and provides cover for migratory waterfowl and other wildlife of economic value.

Great Plains farmers cooperating with the Soil Conservation Service report mallards, blue-winged teal, pintails, and ruddies nesting and rearing their young on small ponds constructed in Colorado, Texas, and New Mexico. Cinnamon teals, redheads, canvasbacks, coots, grebes, avocets, phalaropes, and killdeers nest around other ponds in the area.

Muskrats often become established and one Great Plains cooperator regularly takes up to $150 in muskrat pelts each year from four small ponds.

At least a part of the pond must be fenced so that livestock will not trample out the aquatic plants. Some cooperators fence a narrow lane down to the water and others fence the entire area and pipe the stock water through the dam. The Soil Conservation Service suggests to cooperators that they build ponds at least 1 to 2 miles apart, so that concentration of livestock will not cause overgrazing about the water places.

Federal, State, and local agencies are cooperating in building more ponds on the Great Plains. The Soil Conservation Service has constructed 2,126 ponds on 1,120,000 acres—or a pond to every 527 acres. Under the Water Facilities program of the United States Department of Agriculture additional ponds will be developed in 21 counties in Colorado, Kansas, New Mexico, Oklahoma, and Texas.