Prof. Riley had most happily and appropriately designated it in the use of the term "cyclone."

In conclusion the Prof. said: "These different devices have been perfected under my direction in the work at the Department of Agriculture, chiefly by Dr. W. S. Bairnard, one of my assistants, whose time for the past three years has been entirely given to experiment and research in this direction."

Prof. Riley was then asked by several members where these several appliances could be obtained and whether they were in the market. He replied: "They are Government property and for this reason they are not in the market. They have been invented and perfected as part of my work in the Department, and hence every one has a right to make them. Full descriptions of them have been, or will be published in the Official Reports. I may say that had they been invented by private individuals and patented they would probably before this have attracted more attention, and been placed upon the market by private enterprise."

OUR EXPERIMENT STATION:

WHAT IT HAS DONE AND WHAT IT OUGHT TO DO FOR THE HORTICULTURAL INTERESTS OF THE STATE.

ELI MINCH, before New Jersey State Horticultural Society.

Mr. President and Gentlemen — With the best of feelings for the success of the Experiment Station, these thoughts on the work and needs of the station are presented to you. We desire to find no fault with what has been done, but a desire that more should be done in the interest of all branches of agriculture.

While the work of the analytical department perhaps is complete, yet the practical part of the work gives us but little aid in studying the complicated problems of the proper application of the fertilizers, of which the station makes so thorough and exhaustive analysis, to the practical part of
the subject—the growth of the plant. We find the report of the analysis states that the fertilizer contains so much per cent. of potash, phosphoric acid or ammonia, and the cost of the fertilizer is so much and the value of the crude potash, phosphoric acid and the nitrogen is so much. This is apparently all well, and the reader would, perhaps, suppose the difference of any fertilizer to him would be shown by the value of the crude potash, phosphoric acid and nitrogen the fertilizer contained. Were this true, all that the intelligent agriculturist need do would be to consult the table of analysis and at once know what to purchase of the many brands of fertilizers. This is an error. No analysis of a fertilizer composed of raw or crude materials can ever be a just exponent of its value. It may give its exact chemical composition, but not its value to plant life. As sources of potash, phosphoric acid and nitrogen, the crude materials of which the fertilizer is composed, there is a vast difference in value to the proper and full development of the plant. One form of potash may be more valuable than another, so of the other constituents. The plant may easily feed on one form and not on another. Thus a fertilizer may contain a large quantity of horn shavings, another nitrate of soda, another the carbonate of ammonia as found in Peruvian guano, and all of them may show, on analysis, the same per cent. of nitrogen, and by the station's tables of analysis be of the same value to the farmer or fruit grower. Those practical farmers who have used Peruvian guano and horn shavings, or nitrate of soda, on farm crops, know this is not so. By chemical analysis the greensand marl contains the following crude materials, the value of which we give, by the station's estimated values, in the following table:

**GREENSAND MARL.**

<table>
<thead>
<tr>
<th></th>
<th>Per cent.</th>
<th>Value.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potash, 4.</td>
<td>7.50=150 lbs. per ton, a 4c,</td>
<td>$6 00</td>
</tr>
<tr>
<td>Phosphoric acid, 4.</td>
<td>=80 lbs. per ton, a 4c,</td>
<td>3 20</td>
</tr>
<tr>
<td>Total value,</td>
<td>-</td>
<td></td>
</tr>
</tbody>
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$9 20

Which makes a ton of dry marl worth, by station value, $9.20 per ton to the farmer. The value of phosphoric acid
is rated at ten cents per pound if soluble in water, in fine
ground rock phosphate two and one-fourth cents per pound,
or four times less. The practical farmer knows that the
plant will thrive far better with the application of the one,
four times richer in phosphate, over the other.

There is a vast difference in the feeding capacities of
plants. One form of potash will be more valuable to one
plant than another, and hence of greater value. Buck-
wheat will fail to respond to the application of potash in the
form of kainit, yet rye and corn thrive finely with heavy
applications of it. The same is true of other plants and
other forms of fertilizers. This is called the feeding capac-
ities of plants, and has no regard to the amount of potash,
soda, lime or other ingredient a fertilizer may contain, as
shown by chemical analysis, but to the form in which
they exist. I am aware the Station report of 1882, page 44,
speaking of potash as found in the greensand marl, says:
"We have no evidence that it is of any effect in growing
crops and we cannot assign any price for it." I am also
aware that a manufacturer, by a cheap chemical manipula-
tion, may make it a basis of a fertilizer, so that every ounce
of the potash it may have, with the common modes of
analysis—the Station's value, and the value of the phos-
phoric acid, may be greatly increased in estimated value
with little increase in real value.

The members of this society are interested in this object—
the feeding value of fertilizers—as much as in their com-
mercial value. Horticulture has need of all the light of
science to understand in a thorough manner the value of
fertilizers to different forms of plant growth. The horti-
cultural interests of New Jersey are of vast magnitude. The
products of her gardens feed the citizens of large cities in
many states. The horticultural products of her soil are
found on sale in the markets of cities that are almost within
sight of the Rocky Mountains, and from their fine quality
meet a ready sale.

Our soil, as all well know, which produces these products
is of a sandy nature, more or less sterile, and without the
use of manures will fail to respond profitably to cultivation.
We know that fruits of varied characters and classes require for growth different fertilizers. The proper form of the fertilizer to plant growth is the problem that now agitates the horticulturist. These facts can only be found out by practical tests and trials. Some of these have been carried out by Mr. Arnold, of Vineland, with the sweet potato, and by Mr. J. B. Rogers, of Milburn, with the strawberry. Those of E. S. Carman, of the *Rural New Yorker*, on the potato tests, and others of like nature, we feel should be undertaken by the State Experiment Station. If for a special crop we need a special fertilizer, we think we ought to know it. We think if soluble phosphoric acid from bone is rated at six cents per pound, and that of the rock phosphate only worth two cents per pound, we want to know it, and think the Station should test these *theoretical values* by a practical test. We have not all of us the means and time to make these trials. We feel that the State Station should undertake them. The tests made by the Connecticut Station, by Prof. Atwater, on potato fertilizers, alone yield a profit to the writer of over one thousand dollars on one crop. We should, with a Jerseyman's pride, feel prouder to accord the merit to our Station, but justice compels us to give it to another. These experiments, properly performed, pay the farmer. If combined with science, the conclusions reached from them will be correct. We feel the Experiment Station has not done its duty to the horticulturist and fruit grower. They should assume a more practical form than a mere analytical station for the analysis of fertilizers, having no regard to the effect of these on plant growth. This is unjust to the manufacturer and unjust to the consumer. We may have two fertilizers of equal commercial value, or cost, which, when applied to a certain crop one may seem to possess a value far exceeding its cost, while the other may make a showing far below. This difference may be due to the difference in the plant food in the fertilizers or in the disability of the plant to assimilate it. We want to know these crops and see the fertilizers on trial. The Station has means to make these trials; if not, then let us give the Station more support.
It is to be desired that the Station give more attention to horticulture, and test the many fruits that are new and perhaps valuable, and by trial find the best fertilizers for them, at the least outlay of time and money. I would like to see a specimen fruit orchard, where fruits could be seen on trial. I would like to see the feeding capacities of plants tested with the best forms of crude fertilizers. I would like to see if sulphate of potash be nearly twice as valuable as the muriate of potash to plants, and if so to what plants. Experiments need to be made on the immediate effect of cross-fertilization of plants, that the fruit-grower may know whether berries are rendered better in flavor and form if planted near certain other varieties; and if so, what varieties. The effect of special fertilizers upon the reproductive parts of the plant should be tried, that varieties may, by that means, be saved from barren flowers and imperfect fruit. The germination and vitality of seeds need to be tested, and the proper depth of planting for the different kinds. New vegetables should be tested and their value given. Insecticides should be tested and those claiming to be harmless, that contain active poisons, as Paris green and London purple, should be exposed. The relative value of soluble and insoluble phosphate should be ascertained by a practical test in plant growth. The cheapest form of available nitrogen, phosphoric acid and potash for the different families of plants should also be ascertained by a practical trial.

These experiments must be all made sooner or later. Who will make them?

PLANTING A SCHOOL GROUND.

The inquiry sent me for a reply reads:

"Given a bare school ground of one square acre of sandy land, facing west, surrounded by houses, so that no good views can be obtained, please put an outline of a school building thereon, 24x36, and indicate the outhouses and plantations. The work must not be expensively done, but while