Stone Company, who furnished the Amherst stone, and the reproductions of the floor plans to the kindness of the architects.

CHARLES F. MABERY.

THE STATUS OF EXPERIMENTAL AGRICULTURE.

THE average farmer is eminently conservative when about his routine of work. He dislikes innovations as to methods and distrusts ways and means not clearly "practical." This obtains naturally from his life work. His maintenance depends upon the precarious lives of plants and animals, which in turn, in so far as they as beings are concerned, thrive or perish according to the fiat of life principles, of the working conditions of which, he, in common with the rest of humanity, knows comparatively little. Experiments are costly on the farm, time is cash in hand, and new methods or added work, either apparent or real, must be backed by necessity or success, else the usual method or condition will remain unchanged — "The good old way, good enough."

Because of this general conservatism, held principally in position by the abstruse nature of the principles of life, principles and practice of agriculture advance to place, gain permanence of character, recognition slowly, indeed, in comparison with development of other occupations, even with that of the adoption of farm conveniences, would at first thought seem almost at a standstill, so that, ease of work, convenience, better machinery and appliances, yet seem to leave the yield of labor much on an old-time basis.

This is the dark side of the prospect of agriculture; that, after all the years of man's efforts on the soil, virgin lands still predominate in yield, and regions once prosperous are no longer up to the standard of the new. Belief that such should of necessity have occurred, or that the present new shall eventually become as the old, need not here be disclaimed,— conditions differing much from those of old militate against such retrogression. The true agriculturist no longer rushes blindly along with or against working principles of nature, — taking all or getting nothing according as her resources yield to methods used, — but stands in many aspects master of principles which, under rational control, constantly tend toward lasting improvement, greater returns in every field of labor.

Aside from that which accrues from rapid general enlightenment, many factors unite in this country to place principles of agricultural pursuits upon a higher plane, amongst which may be named the rapid occupation of available wild lands — the removal of a strong incentive to those of most changeful mood as to locality. But by far the most hopeful aspect, the condition most distinctive of agricultural development, is the recognition of the idea of experiment and the value of such effort upon the farm. Many, indeed it may be said almost all of the most enlightened, successful farmers spend a great part of their individual time in work of an experimental nature, such work as a few years since would have been spoken of as "puttering boy-play." While, as previously noted, agriculture as an occupation has in general, from the beginning, made less definite systematic advance as to principles of action than that noted in other professions, this can scarce be said of its later years. Indeed, it is hardly to be questioned that in the last decade greater progress has been made in agriculture as a science, more definite principles of procedure gone into test than in all other occupations of the country. Never before has the farmer been so willing to accept, try new methods, acquiesce in scientific theories and demonstrations; questions that never broke through the cloud of sadness mantling the face of the fate-beridden agriculturists of yore are handled, discussed, and worked upon in the light of experimental effort, often with results most pleasing and not without pleasure even in case of economic failure; for, with men who compile results, negative ones are no longer considered as not to be counted. Questions concerning effect of crop on soil, soil on crop, crop on that which follows are in test by every cultivator of enterprise; stock-breeding is made to follow definite laws of development, desert lands made to yield, and diseases of plants and animals, that of old were pests sent by chance or the Evil One, not to be availed against, meet a man actively prepared to resist according to the dictates of reason and direction of those who have previously succeeded or may authoritatively advise.

While the average farmer is thus markedly in an experimental mood, willing to test as is best known, few have time or bases of fact for initiation of experiments. Herein lies the legitimate work, duty of the experiment station, and with wise provision of the general government, every State and Territory in the country is possessed of such an institution. From the first establishment of these institutions, the impetus given to proper agricultural investigation has been most noteworthy. While more has generally been expected of them than has been forthcoming, yet in this connection it is to be remembered that experimental facts are established only after a proper lapse of time. Nevertheless, much of the work, as shown in the published reports and bulletins, is more fragmentary and less indicative of efficient experimental effort than an enthusiast would wish.

There are numerous reasons for the unexperimental indication of many station publications pertinent to anyone conversant with such work. But, aside from all such apparent elements as may vex the ultra-scientific mind, none bears heavier upon the future usefulness of the experiment station than the varying ideas within the stations themselves as to the true mission of the experiment station. Is it primarily educational for the dissemination of facts not commonly known, or is it experimental — to delve after that which is unknown? Among the stations, types of both are to be found, but many are hybrid. Few publications outlining attempts at pure experimentation are open to harsh criticism, but many most lamentable conglomerates appear as the result of the other two ideas. Perhaps attempt at methods "practical" and writings "popular" is an *ignis fatuus*.

Closely associated with this indecision of purpose is the point of how much should be undertaken. In general, it may be said of the individual stations that too broad a field is attempted, considered from the standpoint of the whole force, and with few exceptions with reference to individual work. Only such an expansive (more properly, perhaps, filling) effort, or a disregard of the literature of the subject, could result in a *résumé* upon "Wheat Rust (*Uredineæ*)," appending a recommendation of same preventive applied to smuts of small grains. In this connection remarks upon the effect of unfortunate recommendations upon experimental ardor of the farmer are unnecessary.

With the possible exception of experiments directly relative to the soil, results of scientific worth reached at any one station will commonly be found generally applicable. In order to attain something like systematic effort, and to prevent useless, costly repetition, it may yet be found effectual, necessary, to league the experiment stations of the country. Each station could support one or two departments of inves-

tigation without materially curtailing effort in either; it cannot do all.

Though waning, much evil to true experiment is centred about an idea based upon the much abused words practical and popular, i.e., the farmer should see from the results, good crops, fine stock, etc., that the station is practical — it must be popular. Such a condition is well, but may be a delusion so far as experiment is concerned. It is not enough for an experiment station to show that it has been able to raise an average of forty bushels of No. 1 hard wheat per acre, for a period of ten successive years. It is not enough to compile facts merely for educational (popular) effect. The farmer who is looking for properly initiated experiments, the man who is able to appreciate such and profit by them to the enlightenment of his less able, less active neighbors, while he may be interested in such evidences of capability, rightfully expects more. The station management which, after a decade, has only succeeded in well accomplishing work similar to that indicated will nevertheless be in logical position to answer the question: In how much have you augmented the aggregate of working principles of agriculture?

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NOTES AND NEWS.

MISS AMELIA B. EDWARDS, who died recently, has in her will endowed a Chair of Egyptology. Her library, which is very valuable, she has bequeathed to Somerville Hall, Oxford.

— Professor Liversedge, of Sydney, in a recent paper, states that iron rust is usually considered to be an hydrated sesquioxide of iron; but, on examining a very large number of specimens of rust from many different places and formed under a great variety of conditions, he found that in almost every instance the rust contained more or less magnetic oxide, in fact, in some cases the rust, though presenting the usual rust-brown color and appearance, was, when powdered, wholly attracted by a magnet.

— In addition to the Grand Honorary Prize placed at the disposal of the Boston Society of Natural History, by the late Dr. William J. Walker, "for such investigation or discovery as may seem to deserve it, provided such investigation or discovery shall have been made known or published in the United States at least one year previous to the time of award," which has been unanimously awarded to Professor James D. Dana, referred to in *Science* of April 29, the Society has awarded, from the annual Walker Prizes, a first prize of one hundred dollars to Baron Gerard de Geer of Stockholm, for an essay entitled "On Pleistocene Changes of Level in Eastern North America," and a second prize of fifty dollars, to Professor William M. Davis of Cambridge, for an essay on "The Subglacial Origin of Certain Eskers."

— Mr. James M. Macoun of the Canadian Geological Survey Staff, who accompanied the British Commissioners to Behring Sea last year as secretary, has left Ottawa *en route* for Alaska, to observe the habits of the fur seal during the present season. It is proposed that he shall go over the same ground which the Commission traversed last year, to examine specially whether there is any variation in the numbers of the seals. Last year the photographer of the expedition succeeded in obtaining a large number of excellent views of the rookeries, which will furnish a good basis for comparison with a similar set to be taken this summer. Mr. Macoun expects to spend the early part of the season on the Aleutian Islands, proceeding to the Pribyloff Islands only when the seals gather there for the summer.

—It is well known that serious loss is caused in the various Australian colonies by the ravages of the rust fungus in wheat. An Intercolonial Conference, as we learn from *Nature*, met to consider the subject in 1890, and this body has since held two other meetings, the third having taken place at Melbourne last month. Many experiments have been made, and it has been clearly shown that there are several varieties of wheat which, except under very unusual circumstances, are never seriously attacked by rust. It has also been shown that in many districts early sown wheats of a rust-liable kind generally escape damage by rust, when the same wheats sown late suffer seriously. In view of these facts the Conference has directed attention mainly to encouraging the growth of varieties less liable to be attacked by rust, and also to early sowing. At the March meeting it was recommended that a practical system for the production and distribution of rust-resisting wheats suitable to different districts should be immediately established, and that this system should, subject to modifications needed by each colony, be conducted on the following lines: A central station for each colony for the preliminary testing of new wheats introduced into the colony; for the production of new varieties by cross-fertilization and by selection; and for the distribution of suitable wheats thus obtained to representative districts of the colony, to be there subjected to a sufficient test, and, if necessary, fixed in their characters by farmers and others competent for the work; and that such wheats as pass satisfactorily this test should then be distributed to the farmers around in such a manner and by such agency as would be most suitable to the conditions of each colony. A committee was appointed to take steps for the proper naming of the different varieties of wheat.

— At the meeting of the Royal Meteorological Society, the 20th of April, a paper was read on "Anemometer Comparisons," by Mr. W. H. Dines. This was a report on a valuable series of experiments which have been carried out at the request of the Council of the Society with the view of obtaining a direct comparison of the various anemometers in common use, so that some opinion might be formed as to which type of instrument is the most suitable for general purposes. The Meteorological Council have defrayed the cost of the work. The anemometers which were compared were: 1, Kew-pattern Robinson; 2, self-adjusting helicoid; 3, air-meter; 4, circular pressure-plate (one foot in diameter), and 5, a special modification of tube anemometer. Most of these instruments are of the author's own invention, as well as the apparatus for obtaining automatic and simultaneous records from all the instruments upon the same sheet of paper. It appears that the factor of the Kew-pattern Robinson is practically constant and must lie between 2.00 and 2.20. The helicoid anemometer is quite independent of friction for all excepting light winds, and different sizes read alike, but it is not so simple in construction as the cup form. The air-meter consists of a single screw-blade formed of thin aluminium, and made as nearly as possible into the exact shape of a portion of a helicoid. A similar instrument with a larger blade and with the dial protected from the weather would probably form a useful and correct anemometer. It would be light and offer a very trifling resistance to the wind. The oscillations of the pressure-plate must have been considerably damped by the action of the floating weight, but as it was they were sufficiently violent. It seems probable that the remarkably high values sometimes given by the Osler pressure-plate may be due to the inertia of the moving parts. The tube anemometer appears to possess numerous advantages. The head is simple in construction, and so strong that it is practically indestructible by the most violent hurricane. The recording apparatus can be placed at any reasonable distance from the head, and the connecting pipes may go round several sharp corners without harm. The power is conveyed from the head without loss by friction, and hence the instrument may be made sensitive to very low velocities without impairing its ability to resist the most severe gale.

— In *The Studio* for May 7, Mr. Gaston L. Feurardent has an article reviewing the one written by Mr. Edward Robinson of the Museum of Fine Arts of Boston, Mass., and published in the *Century Magazine* for April: "Did the Greeks Paint their Sculptures?" Mr. Feurardent, while giving Mr. Robinson full credit for the research and learning so amply shown in his article, finds himself unable to accept his conclusions so far as they relate to the painting of marble statues of the higher class.