

of thermal relations in the matter of classification regarded as only supplementary, and even the 'law of maximum work' degraded to a mild assertion of the general probability of the occurrence, under physical conditions as nearly constant as possible, of that one of conceivable operations which shall evolve the greatest quantity of heat. Fortunately in the measure of relative affinities the effect of physical disturbance is at a minimum; and it is on this line that the author predicts, and rightly, as it seems, the surest advance. Mr. Muir has laid his audience under obligations; and, in view of the excellence of the work, some few depreciatory (perhaps quixotic) references to the baleful influences of structural chemistry and the bond theory will doubtless be passed over lightly.

NEW YORK AGRICULTURAL EXPERIMENT-STATION.

THE fourth report of the New York experiment-station contains the results of a vast amount of work upon various branches of agricultural inquiry; and, if the first impression which it makes is of a certain vagueness and lack of definiteness in its conclusions, a further study shows that much of this effect is due to the magnitude of the problems attacked, and the consequent incomplete character of the work at present.

As in former years, the work of the station has been largely botanical and horticultural in its nature, although other subjects have also received considerable attention, particularly stock-feeding and related subjects.

The work of the chemist upon the relative volume of the fat-globules in milk from different sources, and upon the structure of these globules, is full of interesting and suggestive results. By means of an ingenious method of his own devising, he has been able to determine microscopically the number of fat-globules in a given bulk of milk, and, by combination with the results of chemical analysis, their average volume. By this method he has shown, that, when milk is churned at a temperature above the melting-point of butter-fat, the number of fat-globules is increased: in other words, the fat-globules can be divided. He has thus, it would seem, disposed finally of the theory of a membrane surrounding the fat-globules, and completed the proof that milk is an emulsion, and behaves essentially like any other emulsion.

Fourth annual report of the Board of control of the New York agricultural experiment-station, for the year 1885; with the reports of the director and officers. Rochester, N.Y., E. R. Andrews, pr., 1886. 8°.

But it is on the botanical and horticultural sides, as already intimated, that we find the greatest amount of work expended, and the most comprehensive plan of operations. There are, among other things, a botanical description and provisional classification of forty-three varieties of wheat, and a description of the leading varieties of lettuce (eighty-seven in number, according to the station's classification, and gleaned from at least two hundred differently named lettuces by the labor of three seasons). There is also a description of the products of a hundred and forty-eight varieties of maize, planted under such conditions as to insure extensive cross-fertilization, and tending to show that the variations thus produced can be referred to named varieties. All this, it will be observed, is in the line of agricultural botany; and the report contains the records of a large amount of other work, with many species of plants which may sooner or later be available in the same direction.

We shall watch with interest this attempt to reduce to system the present chaos in the nomenclature of agricultural varieties. The director of the New York station is confident that these varieties are much more persistent than is usually supposed; and, in the interest of both science and practice, it is to be hoped that his confidence will be justified by the outcome of his own and his assistant's labor.

The report of the botanist deals largely with plant-diseases, the most interesting portion being the demonstration that pear-blight is due to the activity of a bacterium.

The student of agricultural science may be inclined to regret the time which has been spent upon numerous side-issues and single experiments of no scientific value, and to wish that the large resources of the station had been expended in more extended and thorough scientific work upon a few problems; but he will not forget that a public experiment-station is not a purely scientific institution, but has duties to the man of practice as well, which are often best subserved by experiments, in which the purely scientific man can see no value. We have before now taken occasion to express freely our belief in the greater ultimate value of scientific investigation; but we desire to record also our appreciation of the value of carefully performed and conscientiously reported 'practical' or 'empirical' experiments, such as are to be found in this report. The New York station appears to us to be doing excellent work in both directions, and it is to be hoped that the liberality of the state in providing means for its prosecution will serve as an incentive to other commonwealths.