SCIENCE

FRIDAY, SEPTEMBER 30, 1887.

IN A RECENT NUMBER of *Science* (x. No. 240) we had occasion to refer to the beneficent law now existing in several of the States, prohibiting the employment of color-blind persons on the railroads of those States, and instanced Massachusetts as the first one to enact such a law. At a meeting of the Brotherhood of Locomotive Engineers, just held in Boston, at which three thousand railroad-engineers were said to be present, one of the speakers who addressed the audience was received with great applause, because, as the chairman said in introducing him, "he secured the repeal of the obnoxious color-blind law," — a questionable honor, if true; but, from the best information which we are able to obtain, the law still exists, although it has been modified in a manner which in no wise weakens, but, on the contrary, rather strengthens, its practical working. It is not to be wondered at that railroad employees object to a test of their qualifications which may result in the loss of their positions, but we imagine that any attempt to repeal the law would meet with the determined opposition of the entire travelling public. The single instance which occurred in Connecticut, where twenty-one railroad employees were found wholly color-blind, is sufficient proof of the necessity of such a law, and, instead of endeavoring to repeal existing laws, a strong and continuous effort should be made to extend their provisions to other States.

DISTILLERY-MILK REPORT. — V.

THE attempt which *Science* has made to obtain facts and opinions in reference to the effect of distillery-swill upon the animals to which it was fed, both as to their health and the wholesomeness of the milk secreted by them, has been measurably successful. As was to have been anticipated, the opinions greatly outnumber the facts. To any one who has had experience in similar inquiries this will be a matter of no surprise. The difficulties surrounding a mathematical demonstration of a problem so intricate as this are well-nigh insurmountable, unless a thorough investigation is made by skilful and competent men with all the necessary means at their disposal. The fact that such an inquiry into the matter under consideration has never been made, is very evident from a perusal of the replies which *Science* has received from its correspondents. These replies show that medical and other professional men are divided as to the effect of swill-milk upon human beings, although those who regard it as unwholesome food, and as injurious to those who consume it, greatly preponderate. The evidence seems also to point to the conclusion that when distillery-swill is fed to cows in connection with other food, and the cows kept in properly ventilated and clean stables, with a sufficient amount of exercise in the open air, it is not injurious to these animals. But, on the other hand, it likewise appears, that as ordinarily fed to animals that are confined continuously in close and filthy stables, without admixture with other food, the consequences, both to the animals themselves and to their secretion, are most pernicious.

The lack of definite knowledge on a subject of such vital interest is greatly deplored by those who have expressed themselves on this point, and it would seem that the time has come for a thorough investigation into the question at issue. Until within a few years, such an inquiry could only have been made by individuals or by societies, in much the same manner as was undertaken by the New York Academy of Medicine in 1858. It is manifest that the results to be obtained in this way, valuable as they are for some purposes, cannot definitely settle the question so as to satisfy the minds of all. If the experimental stations established by both the national and State governments cannot take up an issue of such general importance as this, it is very much to be regretted. Believing, however, that such is their legitimate work, we shall endeavor, by every means in our power, to bring about this desirable action on the part of the stations, and would solicit the assistance, in the accomplishment of this end, of all who have the necessary influence. We shall also take the liberty of suggesting the general plan upon which such an investigation should be carried out. This we do with the greater assurance, because we have received most valuable suggestions from Professors Law and Brewer, and Drs. Sturtevant, Newton, Salmon, and other authorities, with whom we are in perfect accord.

One suggestion made by Professor Brewer, would, if carried into practice, be a crucial experiment. He says, "If you can convince a few orphan-asylums and foundling-hospitals that it would be an innocent and harmless experiment to feed half of their children on distillery-swill milk, and the other on grass-and-grain milk, and continue this experiment for several years, on different races of children, in different localities, some of the swill-milk stables to be kept as clean as other stables may be, by some process not yet announced, and carefully record and collate all the results, the question would then be settled, in the usual acceptance of that term." The impracticability of such a plan no one appreciates better than Professor Brewer. He therefore adds, "Until some such plan for 'positive evidence' be secured, I suggest that you work at the method of cumulative evidence, which has been so rich in conclusions and beneficent in its results in other departments of sanitary science."

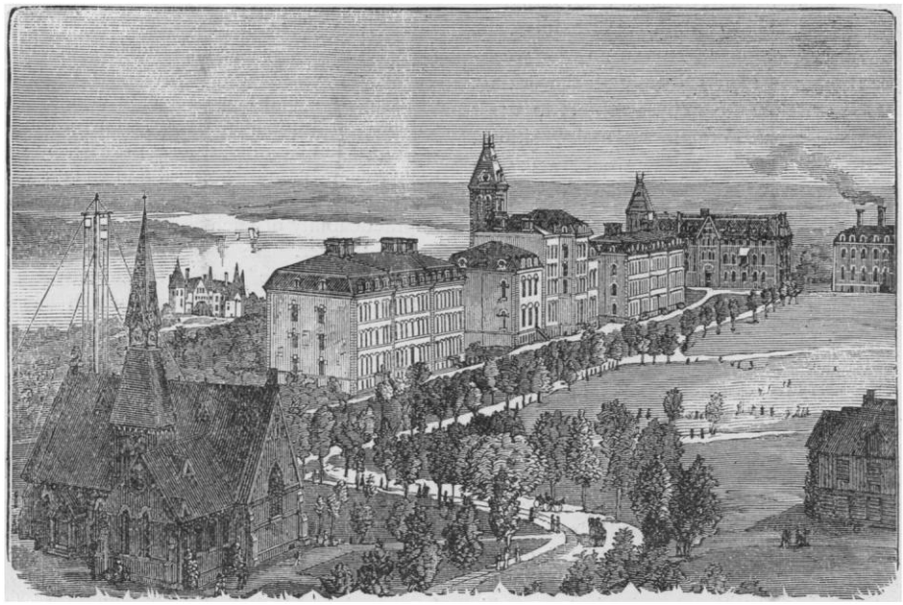
There appears to be some difference of opinion as to the exact chemical composition of distillery-swill, under different circumstances; so that in carrying out any experiments the following points, as suggested by Professor Law, should be ascertained and recorded: (1) Is the swill fresh? (2) Has it undergone any other than the alcoholic fermentation? (3) Is it uniform in quality as supplied from day to day? (4) At what heat is it fed? (5) Does it contain the simple original grain-products, — gluten, salts, etc., — or has there been added any chemical agent used in the manufacture of the alcoholic liquid? These inquiries are necessary, because the effect of swill when fresh may be entirely different from swill in an acid or decomposed state, and the allegation has also been made that injurious chemical agents are added. The temperature of the stables in which the experimental animals are housed should also be recorded. In short, every condition which is liable to enter as a factor into the problem should be intelligently regarded. Dr. Salmon advises that biological analyses of the milk should be made, in order to determine the relative number of germs as compared with milk from country pastures.

Hitherto chemical analysis has been mainly relied on in determining the quality of the milk; but, as Dr. Sturtevant remarks, "while this is of assistance, it cannot alone determine the questions relative to healthfulness. The question should be investigated from the chemico-physiological standpoint: determine whether substances not met with in ordinary foods can be traced through the animal to the milk; whether bacterial germs exist in the food, and whether such can be traced through the animal to the milk; whether animals of a delicate nature will succumb, or show indication of disease, when fed with suspected milk, while other individuals thrive upon a milk considered of a fine quality. The development of ptomaines in feeding substances through neglect of proper precaution should also receive investigation, as a food otherwise useful may at times become dangerous on the neglect of ordinary precaution."

Dr. Salmon does not regard the studying of milk from healthy cattle, fed upon swill under favorable hygienic conditions, as of much value towards elucidating the practical questions involved. "The question," he says, "is not, whether a small quantity of cool

and fresh swill, fed with a suitably prepared ration of other articles of food to healthy cows, having clean, roomy stables, and plenty of exercise, is injurious to the milk, but it is this: Is wholesome milk produced by feeding swill under the conditions in which it is fed in practice, and must be fed in order to make it a profitable industry?" And finally, as Professor Rohé so well expresses it, "a scientific solution of the question will not be furthered by prejudiced appeals or unreasoning denunciation. Patient investigation, keeping in view all circumstances of the question, and avoiding all one-sidedness in considering the matter, will alone bring about the object desired."

With these suggestions to those having in charge the experiment stations, we leave the subject with our readers. We shall be glad to record any observations or experiences which any one may send us in the future; so that, even if public interest cannot be sufficiently aroused to bring about a proper investigation of the subject at the present time, it may, by a reminder from time to time, be kept alive until the demand for such an inquiry becomes irresistible.



NORTHERN HALF OF CAMPUS FROM SAGE COLLEGE, CORNELL UNIVERSITY.

THE SIBLEY COLLEGE EXTENSION, CORNELL UNIVERSITY.

THE extraordinarily rapid growth of the Sibley College of Cornell University since its re-organization and expansion of two years ago, with the introduction of the course and department of mechanical engineering under Professor Thurston, the extension of its shops and department of the mechanic arts under Professor Morris, and the formation of a carefully planned department of the graphic arts under Professor Cleaves, — all under the general direction of Dr. Thurston, — has compelled a corresponding extension of the accommodations for class and lecture rooms, and especially for shops and drawing-rooms. Two years ago, before this re-organization had taken effect, the number of students taking this course was very small, varying from twenty to thirty, perhaps. Last year the freshman class, including mechanical engineers in regular course, in electrical engineering, and special students with the resident graduates, numbered above eighty. The number of applicants this year is so large that the limit for the entering class is necessarily fixed by the capacity of the shops and buildings, including the mechanical laboratory. It is probable that the numbers received in all classes will exceed two hundred and fifty. When all classes are filled on the basis now taken, the college will number something over three hundred students.

But it was originally designed to accommodate very small classes; and, notwithstanding the fact that within a few years it has been more than doubled in extent, it could only accommodate, up to the present time, about two hundred students. To prepare for the incoming class of 1887, therefore, it became necessary to still further extend its buildings. It was thought advisable to more than double the size of the wood-working shops, to increase facilities for instruction in the other shops, and to secure fifty per cent more space for drawing-rooms. The freehand-drawing class alone, this year, which includes students from several other courses not included in the mechanical engineering departments, is expected to number over two hundred and fifty students, and occupies two floors of the main building. The wood-working part of the establishment must accommodate between one hundred and one hundred and twenty-five men, and the other shops as many more. To meet this emergency, a new building was planned, into which all the laboratory apparatus used in either instruction or research could be removed; thus giving ample space, for the present at least, for the extension of the shops, by giving to them the considerable space so vacated, while the remainder of the new structure could be devoted to the purposes of the departments of drawing and machine design.

The engraving on the next page shows the extent and arrangements of the departments of the original group of Sibley College buildings. The main building is seen at the front and left; while beyond it is the laboratory building, in which instruction in chemistry and physics, and the principal part of the tuition and practice in electrical engineering, are carried on. The dynamo-room is in the rear of the main building of Sibley College, and contains a considerable number, and hardly less variety, of dynamo-electric machines, used in the course in electrical engineering principally. The lower floor of this building is devoted to the purposes of library and reading-room, museums, a lecture-room for the junior class, and the rooms of the professor of the mechanic arts. The second floor contains two large drawing-rooms, the lecture-room of the professor of mechanical engineering, and the rooms of the director. The third floor is occupied by the rooms of the professor of drawing, — his office, lecture-room, and two large drawing-rooms like those below. All these drawing-rooms are expected to be occupied by the lower classes; while the senior and junior-classes will have their drawing-rooms in the new structure, now just occupied, which building will also accommodate the resident graduates, professors, and others coming to Cornell for advanced work in this department of the university.

The accompanying plans present the arrangement of the building forming the last of the Sibley College extensions, and now just completed for occupation at the beginning of the college-year 1887–88. It is calculated to be of sufficient size to accommodate the ac-