taught in a school, I used the word *studied* pointedly and advisedly. The advantage of a properly organized school or college would not be by any means limited to *giving instruction;* indeed, the opportunity such an institution would afford to the scientific explorer for the thorough investigation of many subjects of which we have at present a mere shadow of knowledge, would be immense. It is only a few weeks ago that M. Pasteur, the great French chemist, visiting the laboratory I have established at Bayswater, said, "How I should like to spend a month here studying milk ferments!"

MILK FERMENTS.

We have not in England any scientific man of eminence devoting the whole of his time to dairy chemistry and dairy investigation. Pray understand me; I do not mean the "analysis of milk." We have many very talented men, members of the various chemical societies; but men of the class we find in Denmark, Sweden, Germany, Switzerland, Italy, and France—professors, really professors, I mean, "with a great big P," not professors in name only—do not give their attention to this subject, with us; at least, they have not hitherto done so, simply, I believe, because we have not a *habitat* for them—no soil in which they could flourish—no place in which, free from external or business influences, such men could work quietly, and pursue their investigations and observations, surrounded by all the necessary materials upon which to work.

Mr. Lister, F.R.S., Professor at King's College, author of "The Germ Theory of Fermentative Changes," and of "Lactic Fermentation and its Bearings on Pathology," has thrown considerable light upon the bacteria of milk, but his researches have been made, I believe, entirely with regard to pathological science. A few days ago I was reading an address delivered by Mr. Lister, "On the Nature of Fermentation," and I was much impressed with the results of one of the investigations therein described, and its possible connection with "the dairy." The object in view was the study of Bacteria Lactis, the particular form of organism which is the actual cause of what we know as lactic fermentation, or, in more simple language, the souring of milk. Mr. Lister's experiment was to ascertain whether, by preventing the development of bacteria lactis, milk would remain unaltered. He accordingly took means to prevent the development of these organisms; but all the samples of milk underwent fermentation, only of a different sort, the result of which was the development of other organisms, presenting tiny specks or granules, some orange, some yellow, some red, and others green; also two or three kinds of fungi. Mr. Lister came to the conclusion that these organisms declared themselves owing to the absence of bacteria lactis, which would under ordinary circumstances have been present, and would have smothered or killed these other species.

Now may not this throw some light upon the fungi or growth of various colours observable on many of the soft French cheeses, Camembert, Livarot, Brie, &c.? It is well known that the makers of these cheeses look with care and anxiety for the due development of the special shade of colour, upon which the sale of their product so greatly depends, and that these shades of colour should change in due order, as the ripening process proceeds. Why are these farmers so particular? Because the dealers in these descriptions of cheese demand that they shall be of a certain colour. Why do the dealers make this demand? Because it has been found that the best flavoured cheese is always of certain peculiar shades, and that therefore, by valuing the cheese by its colour, they are unconsciously attaching a value to a development of some particular organism, which development is dependent upon circumstances that permit this particular organism to flourish, and which are objectionable to the existence of any other organism. Lactic acid ceases to exist in cheese at a certain stage, and this permits these other organisms to come forth. The question therefore presents itself: Are these various organisms the cause or the effect? If the latter, their importance is not of great moment; but if the former, and both opinion and evidence are in favour of this view, then a great field is opened.

The researches of Pasteur, Lister, and other scientific investigators have proved that, by the introduction of certain germs into the human system, certain effects are caused, and by the prevention of the development of certain germs, other results are obtained. Pasteur has proved that various forms of bacteria *can* be cultivated. May we, therefore, not hope for results from future investigations that may exercise considerable influence upon some of our dairy processes? We have seen that the souring of cream is essential in butter-making. If this be so, it follows that there must be a degree of acidity, a certain development of lactic acid, that shall be better than any other degree. May not pure lactic ferment—that is to say, bacteria lactis free from other forms of bacteria—be obtainable, and in a form that can be added to sweet cream in an exact proportion, just as we add a carefully measured quantity of rennet to milk in the process of cheese-making? I go farther; if these wonderful organisms do exert the influence, and are the *causes*, of certain results, may it not be possible to produce, to grow in fact, the exact species that may be found to exert the desired influence in the ripening of cheese, &c., &c.? Duclaux, a French chemist, found in certain cheese six different forms of ferments—organisms; and further, that one of these, the chain-vibrio, possessed the particular power of making the small particles of curd sticky, so that they more easily became consolidated into a close mass.

By drawing attention to this subject thus roughly and incidentally, I hope to reach the object I have in view, viz., to show how important a part influences comparatively unknown to us at present may, and indeed are playing in the world, and how important is the "infinitely little," and what a field for investigation and study is here open, not to mention the hundred and one other directions in which an earnest student would find congenial occupation. Now where could this be so well provided as in a *school*, with land, plants, and animals, at the beck and call of science?

I was amused to read the other day in an agricultural journal that "opinion is not by any means unanimous in favour of Mr. Allender's proposal to establish dairy schools in this country," then proceeding to quote "the adverse opinion." It may be that the gentleman who expressed that opinion is a much better authority than I am, and that he has given the question more thought and attention than I have, although I dare make a wager he never put foot in a continental dairy school in his life. But when he went on to say that all requirements of the case would be met by the establishment of a travelling dairy, from which lessons in butter-making should be given, I felt *that he had yet something to learn.* To teach a child to read and write is most right and proper, but to call *that* education, cannot be admitted.

If every dairy-maid in England made good butter instead of very bad, as many of them do, it would be an immense step in the right direction. If, however, the object had been only to teach people how to make butter decently, most certainly a dairy school was not needed. But I wanted to get *just a little beyond that*; and, notwithstanding this worthy person's ideas on the subject (perhaps he thinks, "where ignorance is bliss, 'tis folly to be wise"), I adhere to my opinion, and I *do* feel that it is a disgrace to us that we are willing to allow other countries to progress where we stand idly by. I not only hoped to have established a dairy school, but