another on nearly all plants where decay has decidedly commenced. Of all the kinds of botrytis, that which appears on the potato is perhaps the most remarkable; and its singular connexion with the disease of 1845, and again in 1846, will render it perpetually memorable. To say that the disease was caused by this fungus would be contrary to the best evidence, but that it attends and accelerates it is unquestionable. True it is that whole fields, in a sad condition of disease, were seen without a trace of botrytis; but in all contagion, infection, and inoculation, anomalies constantly occur. In most cases, the botrytis was certainly connected with the disease, and a description of its growth will be interesting to every reader. The threads of mycelium interwove themselves amongst the cellular tissue. They ran through the loose intercellular passages of the lower surface of the leaf with great ease, and the fungi emerged through the stomata. Drawings of these modes of growth will be found in Mr. Berkeley's paper, in the first volume of the Journal of the London Horticultural Society. They admirably illustrate the progress of this curious fungus, the mycelium of which was undoubtedly present in the potato plants. It is a remarkable circumstance, however, that this botrytis was found to grow with greater luxuriance on the diseased tubers, where the tissue is far more dense, than in the stems or leaves. That the mycelium of this fungus was contained in the diseased potatoes may be proved from the following singular circumstance: A quantity of silk was, during the early part of the spring of this year, (1846,) perceived to be greatly damaged by a white mould. On submitting a portion of it, for examination, to an individual eminent for a knowledge of fungi, it was at once pronounced to be the *botrytis infestans*, or mould of the diseased potato. The mystery was soon cleared up; for the silk had been dressed with starch from potatoes, and proved a favourable situation for the development of the fungus from the spawn that was in it. Growth in such cases is extremely rapid; and when a potato plant is attacked by the botrytis, of course the juices are consumed by it, the elaboration of sap in the leaves cannot go on, nor, from the stoppage of the stomata by its threads, can admission of air, or emission of any gas or fluid take place. It is certain that the disease which destroyed such quantities of the potatoes in America, Great Britain, and over the continent of Europe, has not yet been satisfactorily explained. Further researches in plants more recently infected may throw additional light on the important subject. Undoubtedly, in most instances the fungus appeared; and where it was not actually seen externally on the leaves, it seems to have exercised an influence on the tubers, which are, in fact, branches or stems under ground, as every botanist knows. Several other curious fungi have also been seen in the tubers, which have not yet been fully described.

Enough has been said to show the extreme importance of more complete knowledge of the habits of parasitic moulds, and of the circumstances favourable or unfavourable to their development. It is hoped that what is now about to be detailed on that subject, as the result of experiments, will be regarded as a step in the right direction. Such steps must form the commencement of all useful discovery. Sound knowledge seldom takes a great leap when it first comes amongst us: it enters by slow and sure movements. The light of genuine science first appears as a spark, which subsequently is fanned by industry into a flame; false speculations, on the contrary, are mostly a blaze of straw.

It is purposed, in pursuing these inquiries, first, to advert to the experiments made by Dutrochet, one of the most ingenious of French naturalists; and then to describe some that were made by the author, in the spring of 1846.

It may be known that if the sap of certain plants, as the vine for instance, be kept in glass vessels, certain filaments will soon be seen floating in it; but few persons are apprised of the fact, that these filaments are the mycelia of moulds. If solutions are made of gum, isinglass, or glue, the same kind of filaments will appear, and they also are the mycelia of moulds. From these mycelia, or specimens of spawn, there grow two species of moulds, one articulated, corresponding with the simplest form described in the first chapter, and the other having the threads from which they spring entirely destitute of articulations. The articulated moulds look under the microscope like strings of little pearls, and are therefore called *monilia*, from *monile*, a necklace, because necklaces are frequently so constructed. The non-articulated threads pass by the name of *botrytides*, because they produce botrytis fungi of different kinds. Dutrochet, aware of these peculiarities, instituted a set of ingenious experiments with a view to determine the properties of liquids favourable to the development of one or the other. He disclaims at the outset all idea of spontaneous, or equivocal generation, and attributes germination to the causes to which they have been before assigned by the writer.

The first thing he discovered was, that pure albumen is altogether unfit for the growth of any kind of mould. A solution of white of egg in distilled water, kept for a whole year, yielded no mould whatever, though placed in a damp situation, and in all the other conditions usually deemed propitious. This liquid was then taken, and placed in glass vessels containing an ounce each, and into every one was put a single drop of some acid. The acids applied were sulphuric, nitric, muriatic, phosphoric, acetic, and oxalic. In every case, after about eight days, articulated moulds, of the same microscopic character as common blue mould, with which almost every one is familiar, made their appearance. These beaded threads constantly grew under these circumstances; but if there was added more than a certain quantity of any of these acids, there were no results at all. The mixture was found to be too strong.

It next occurred to Dutrochet to try alkalis, instead of acids. Accordingly he dropped into the solution of white of egg in distilled water, a little caustic soda, and caustic potash. To his delight, after a longer time than in the other cases, he found that the mould which these mixtures yielded was invariably without articulations. Botrytides were always developed by these alkalis.

Hasty observers would have concluded from these facts that acids exclusively favour the growth of articulated moulds, and alkalis of those which have no articulations. Dutrochet, however, was not disposed to make any such incautious generalization, and tried two more curious experiments.

The first was, to mix fibrine of blood with a little liquor potassæ, or solution of caustic potash, in distilled water. The mould springing up in this case was not a botrytis, as might have been expected, but a beaded mould with articulations.

The next trial was to distil the juice of a lettuce, and to add to the distilled liquid a little phosphoric acid. Here again a result took place contrary to expectation, in the appearance of moulds without articulations. The distilled juice of the same lettuce which was used in the second experiment, when left alone, yielded no mould whatever.

Whenever, on the other hand, the distilled juices of any plants, such as peach leaves, laurel leaves, and others containing prussic acid, were left in a similar situation, they invariably were found to give rise to moulds. The reason obviously was, that the acid passed over in the act of distillation. Every vegetable juice on which experiments were made produced moulds, if it contained any acid whatever, even though not in sufficient quantity to redden vegetable blues, the most easy test of the presence of an acid in any substance. These beautiful investigations were detailed at length by Dutrochet in the "Annales des Sciences Naturelles," as long ago as 1834, but somehow did not attract the attention they merited.

The salts of potash in vegetable juices certainly seem, according to these experiments, to be favourable to the development of mycelium of moulds. It also seems, from other facts relating to this matter, that there is both a maximum and minimum of such salts requisite for preventing or facilitating their growth.

No neutral salts produced any effect; and this explains why albumen yielded no moulds, notwithstanding the soda it unquestionably contains, and which would have induced the expectation of their growth in that substance. The reason is, the soda in albumen is in the state of albuminate of soda, which