a necessary of life to this plant. But there are varieties of hill rice which grow healthily, and ripen on dry land. This difference, though a little more striking, is, in reality, not more remarkable or deserving of attention than the constitutional differences above mentioned in regard to barley.

5°. *The Turnip.*—The numerous varieties of turnip so generally known in this country, differ little less in habit, and tendency, and choice of soil, and power of resisting the effects of climate than varieties of grain do. It is essentially favoured by a cold and humid climate. Hence it is a less profitable culture in our southern countries, and yields less abundant crops along our eastern borders. The yellow and the white varieties differ greatly in nutritive value and in climatic habits. Of white turnips, again, varieties differ. Thus the *white stone* comes quicker to maturity than the *white globe;* so that what is fitted to nourish and bring forward the one will not promote the growth of the other in an equal degree, or cause it in the same month of the year to yield an equal crop. In different districts, also, and under different treatment, the same variety is differently nutritive—a circumstance of much importance in all experiments on feeding.

The turnip is also liable to special attacks from insects, and to special diseases—such as that called fingers-and-toes—accidents which are more or less completely beyond the calculations of pure or theoretical chemistry.

6°. As the cultivated carrot is the offspring of the wild carrot, (*daucus carota,*) so the white beet (*beta vulgaris campestris alba*) are allied to the sea-side beet, (*beta maritima,*) which, like them, has a fleshy root, and is good for food. This analogy indicates the probable wants of the beet tribe, the probable utility of saline applications to the plant while growing, and the especial expediency of making experiments upon it with that common salt for which the *Beta maritima* frequents the sea-shore.

The farmers of the Guildford Club, (Surrey,) in a recent discussion on the growth of beet, came to an unanimous resolution that, in their soils, experience had shown common salt to be a valuable promoter of the growth of this root, and that it was worthy of being recommended.

The analogy above stated throws light on this result of practical experience, and points out to the improving experimenter the special value to him of a familiarity with such analogies: they not only modify and restrain the conclusions to which pure chemistry might erroneously lead him, but they indicate new paths of inquiry on which his chemical knowledge may exercise itself to the manifest advantage of scientific agriculture.

7°. *The pea* exhibits, among its several varieties, similar liabilities to be attacked by insects as the turnip does, and which, as in the case of the turnip, do not admit of easy or satisfactory explanation.

I lately saw on the home farm of Lord St. John, at Melshburne, in Huntingdon, a field of winter peas, sown in November 1848, which had been all treated and manured alike, but on one half of which the seed sown was the early maple—a common field pea; on the other half the Ringwood marrow dwarf—a white pea. The latter was attacked at Christmas by the slugs, and in great part devoured so as to require filling up with fresh seed, while the former—the gray pea—was untouched by them. There may have been some other reason besides the difference of variety for this limited attack of the slug; but it is obvious that circumstances or liabilities of this kind may materially modify the effect of chemical applications made to our crops, and may be the often unsuspected cause of important discordancies in our results.

I might give many other illustrations of the general habits and analogies of our commonly cultivated crops, and quote many special physiological facts, such as that dry weather makes roots like mangel-wurtzel run prematurely to seed, and that the seed so prematurely formed produces plants which, under any circumstance of weather, exhibit a similar tendency, (Stephens;) that, to succeed equally, some seeds, like that of the parsnip, must be sown new or fresh, (Le Couteur,) while others will germinate readily and healthily though kept for years, and so on; but the examples already given are sufficient to show that much other knowledge besides what is purely chemical is necessary to the suggester of agricultural experiments even of a chemical nature. His skill in regard to the circumstances in which they are likely to succeed, and therefore ought to be tried, and, above all, his ability to account for failures and discordant results, will in a great measure depend upon the possession of this practical physiological knowledge.

8°. So in experiments upon trees, no less than upon field crops, practical knowledge of a similar kind is most necessary. That the clays of the gault and weald favour the oak; that the elm flourishes only on the soils of the intermediate more sandy strata; that our cider countries rest chiefly on the old red marls, those of France on the chalks of Normandy, and the tertiary or more recent drifts which overlie them; that, in Bermuda, the coffee-tree grows luxuriantly on the recent hard calcareous rock of that island: such facts as these, with which the practical man is unsually most familiar, are all of much use to the experimental adviser, and are rich in suggestions as to the kind of experiments which are likely to succeed upon each species, as to the method of making them, and as to the kind of soils on which good results are to be expected.