composition of a soil, one might prescribe the treatment of such soil, both as to cropping and manuring, is certainly very attractive; so much so, that farmers holding this opinion are often disappointed when the inability to advise on these matters from soil-analysis alone is confessed, and they are told that the expensive work of analysis is not warranted by the amount of information afforded them, even if they understood the figures at all. Of course if, as I saw in an auctioneer's advertisement in a Sydney paper some years ago, the quantity of a constituent is used to give sale value to land it may be said to be of use. In this case the percentage of nitrogen the soil contained was calculated into pounds per acre, and shown to be equal to the quantity in so many tons of Peruvian guano, and therefore, as this chemist—or charlatan—said in his report, this land was of very great value, but in ordinary cases—*i.e.*, where no abnormal conditions exist, it is as easy for the farmer to judge what crops to grow, and, from a general knowledge of the wants of the various crops, what manure to use for each kind of crop, as it would be if he had the most elaborate analysis in his hand, and it would be much safer.

In case of infertility, and in many other instances of abnormality in soils, chemical analysis is often of great value. I have myself analysed many samples of soil which were absolutely barren, and yet had the appearance of being good soil, and had been taken up as such. The analysis showed in some cases that infertility was caused by such poisonous substances as ferrous salts, or humus acids, or excess of alkali. And it is often of use to know whether your soil contains much or little lime, &c., but to deal with soil-analysis as a sort of medical diagnosis, with the view of prescribing a pill of phosphates or nitrates, or what not, is absurd.

I repeat, in the hands of an expert, having also a knowledge of the soil *in situ*—*i.e.*, of its peculiarities, of its surroundings, aspect, climate, &c., soil-analysis might be of use, and often is; but from analysis alone no one should venture to say that this soil will grow, for instance, white grapes and that red grapes, because the one contains more or less lime, or potash, &c., than the other.

Let me explain why this is so: Firstly, chemical analysis alone is absolutely valueless as indicating agricultural value, as there may be laid before a professing adviser two statements of the results of analysis which may be exactly the same, and yet one may be the outcome of an examination of a mixture of pulverised rock and humus of no agricultural value, and the other that of a very fertile soil. Or we might have an indurated almost useless clay of similar composition with a really rich soil, or even showing a larger percentage of the acknowledged valuable constituents.

But it is in connection with manuring, *i.e.*, in reply to the question "What does analysis say that my soil wants in the shape of manure?" That advice, based upon the percentage of the various constituents a soil is shown to contain, and upon that alone, must especially be fallacious. Why?

It will be admitted that an application of 2cwt. of superphosphate of lime to an acre of land may make the difference between a bad and a good crop of turnips. Would a chemical analysis of two samples of soil from the same field, the one having received such a dressing, the other not, show necessarilly which was the one manured? And if not, how can any one, from a statement of the results of analysis alone, say whether or not a soil requires an addition of phosphates?

An acre of soil to the depth of about 8in. weighs about 2,500,000lb. The amount of anhydrous phosphoric acid in an ordinary 26 per cent. superphosphate is, say, 31½lb. If it were possible to mix intimately 2cwt. of such a superphosphate with the soil of an acre of land and obtain a fair sample for analysis, the result of the analysis would be theoretically an increased percentage of this item of ·0012. That is to say, it would require the addition of 2cwt.—a very good dressing—of superphospate to supply phosphoric acid enough to affect the third place of decimals in a percentage statement. And no chemist, in determining phosphoric acid in soils, can be sure of working so accurately as to be certain that he is correct to the third place of decimals. In fact, ·001 per cent. is within the possible—nay probable—error of analysis.

Again, for the purpose of determining the amount of phosphoric acid in a soil, he generally takes about 60 grains—*i.e.*, one-eighth of an ounce, or one three hundred and twenty millionth of the soil of an acre of land; and to determine whether he was dealing with soil to which had or had not been added 2cwt. of superphosphate, he has to deal with one three hundred and twenty millionth of 31½lb. of phosphoric acid, or about ·00075 of a grain.

Leaving out of the question possible errors of manipulation during analysis, there is the question of sampling to be considered; and I may say that it is practically impossible to select two one-eighths of samples from a bulk which would agree in results to ·001 per cent. or to ·00075 of a grain of phosphoric acid.

And, lastly, published results of analyses of soils seldom tell us the condition of the phosphoric acid therein; and this is all important, for it is upon the solubility of this substance that its value to a great extent depends. So that it may be the case that the soil containing the lower percentage, and yet the larger quantity of available phosphoric acid, that is the more fruitful one.

Take a case in point: Were I to attempt to value the soils of the College Farm for their percentage composition alone I should be wofully out, for in several instances the poorer—and in some cases much the poorer—soil contains the larger percentage of phosphoric acid. In one case it would require 95cwt. and in another 60cwt. of superphosphate per acre to equalise the phosphates in two soils.

Of course it may be said that fertility is not due to phosphates alone. True, but like results obtain when dealing with nitrogen, and were it worth while to enter into the necessary calculations this could be easily shown.

To attempt to advise upon the inspection of a statement of results of analysis of a soil as to whether that soil requires nitrogen, or phosphates, or potash, is to undertake to do what one is not warranted in doing in cases of ordinary soils, though of course it may be stated that the quantity is above or below the average. And to the ordinary farmer, what does a statement of result of analysis mean to him? Does it necessarily convey any meaning at all to him? I do not think it does in any but exceptional cases.