but natural that manufacturers should desire to secure so favorable, though unreasonable, a testimony. For years I have refrained from putting a money value upon manuessent to me for manufacturers; for it strikes me very forcibly that if a maker has not sufficient chemical and commercial knowledge to determine correctly the money value of his own productions, he has mistaken his proper calling.

Although the trade in manures is getting more and more into the hands of a limited number of intelligent and large manufacturere, there are still to be found, here and there, small and ignorant makers, and farmers who make a few hundred tons of artificial manures for their own use and that their neighbours. Generally speaking, a manufacture carried out on such a limited scale brings no advantage to the consumer, and seldom benefits, for any length of time, the producer, who has neither skill, capital, or enterprise to compete with a firm which does a large trade. The price which a manufacturer has paid for his raw materiai, including labour, carriage, bags, &c., is not necessarily a criterion of the worth of the manure, because he may have bought under serious disadvantages. A. man who has not sufficiedt chemical knowledge will often select raw materials which are very good in appearance, but, in reality, cannot be employed so profitably as others; or he may not have sufficient capital to buy in materials which can only be obtained by taking a ship's cargo at a time; or, if he has capital, he may not have sufficient commercial knowledge and decision to take advantage af a favourable turn in the market. For these and similar reasons such a dealer will lose money if he sells the manufactured products at a rate which will yield a good profit to another vendor more favourably circumstanced.

In commercial analysis and calculations founded upon them, the form and conditions of the several constituents are too often overlooked. This is especially the case with respect to the state of combination and mechanical cordition in which the insoluble phorphates and nitrogens occur.

Insoluble phosphate of lime may be present in any of the following forms—One half, or one fourth inch bones, fine bone-dust, boiled bones, bone-black, bone-ash, coprolites, apatite. Estramadura phosphate, Sombrero guano, and phosphatic guanos.

Now, in most of these conditions insoluble phosphate of lime has a different commercial and agricultural value. One fourth-inch bones are more effective and cost more than one-half inch; fine dust is still more expensive; and, generally speaking, the fine bone-dust is the most powerful in its action and the greater the cost of preparation. When bones are acted upon by acid, but not applied in sufficient quantity to convert all the phosphate of lime which they contain in to soluble phosphate, there remains in the mixture a certain quantity of insoluble phosphate, which, in this condition, is still more valuable than in that of fine bone-dust. On the other hand, the insoluble phosphates in animal charcoal (bone black) and even bone ash are of very litt'e use in a turnip manure. Of still less use to root crops, if p suble, are the insoluble phosphates in coprolites, apatite, and other mineral phosphrtes. Intermediate in their action between fossil phosphatic materials and bones ar , perhaps, certain semi-fossil guanos; whilst in Peruvian and several phosphatic guanos the insoluble phosphates are so extremely minutely divided that I am inclined to consider them worth twice as much as phosphates in the form of ordinary bone dust.

It is, therefore, simply absurd to put the same value on insoluble phosphates, irrrespective of the form in which they occur, since in a turnip manure their worth may range from absolutely nothing up to $\pounds 7$, $\pounds 8$, or even $\pounds 12$ a ton.

As regards nitrogen, this element may be presen in the shape of ammoniacal salt, or of nitrate of eoda, or uric acid; or, again, in shoddy, whale blubber, fish refuse, horn and hide clipings, scutch, leather refuse, and many other forms. In all these different forms nitrogen has a different agricutural and commercial value, and it is therefore unreasonable to assume the same price in calculating the money value of the nitrogen which a manure may contain in so many varied shapes.

Besides this, some purely practical matters have to be well consi ered before a fair estimate can be given. In some instances superior composition in regard to ingredients may be more than neutralized by imperfect pulverisation or by a damp and lumpy condition, tending to inequality of distribution and irregularity in the growth of the crop. A fine state of division, dry condition, and uniformity of composition cannot be secured without a considerable increase in the cost of manufacture. No allowance, however, is generally made for this expenditure of money by our rule-of-three chemists; or, if anything at all is allowed, the same manufacturing expenses are assumed whether the manure be fine, dry, and uniform, or the reverse. Injustice thereby done to honest and skilful manufacturers, and at their expense the sale of apparently cheap, but really inferior manures is encouraged. Is the manure dry enough to admit of equal distribution on the land ?---is it very fine, or coarse and lumpy ?-is it uniform in composition?-are the ingredients and their relative proportions in a manure really useful for the purpose for which the latter is recommended ?---what facilities are there in a particular locality for procuring the required fertilisers? -and many similar questions that do not enter for a moment into the mind of a mere "calculating machine," requirs to be well weighed before