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Charles Babbage

Excerpt

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## CHAPTER I.

### INTRODUCTION.

ONE of the most frequent sources of mistaken views in economical science, arises from confounding the nature of *universal* with that of *general principles*.

§ *Universal principles*, such as the fact that every number ending with the figure five is itself divisible by five, rarely occur except in the exact sciences. Universal principles are those which do not admit of a single exception.

*General principles* are those which are much more frequently obeyed than violated. Thus it is generally true that *men will be governed by what they believe to be their interest*. Yet it is certainly true that many individuals will at times be governed by their passions, others by their caprice, others by entirely benevolent motives: but all these classes together, form so small a portion of mankind, that it would be unsafe in any inquiry to neglect the

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great principle of self-interest. Notwithstanding, however, all the exceptions we may meet with, it is impossible to take any just views of society without the admission of general principles, and on such grounds they will be used in these pages.

Self-interest, combined in various degrees with knowledge, assumes the most diversified forms. It excites our contempt or raises our admiration, according to the littleness or the greatness of the object it pursues—according to the temporary or the more distant advantages it seeks. On the one hand, it governs the minister of a party on his doubtful eminence, whilst on the other it guides the enlightened statesman to the object of his distant ambition.

§ Again, it is admitted as a general principle that *each man is the best judge of his own wants and of his own interest*. Now although many individuals, and even whole classes of society, have at times been thought by more enlightened men to have formed erroneous opinions as to their true interest, yet, when it is remembered, that every man must see many views of his own case, and must know many facts connected with it, which he has not communicated even to his most confidential adviser, those who have had most experience are most inclined to believe that the exceptions are much less frequent than at first sight would appear.

Another source of erroneous opinions arises from neglecting causes apparently insignificant.

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In taking a comprehensive view of any subject, it is very desirable to throw into the shade all its minor points ; but in estimating the consequences of any set of facts, there is another condition which must be fulfilled, before we can arrive at accurate conclusions. If we are about to neglect a cause on account of its apparent insignificance, it is *essential* that it should not be one of *frequent* recurrence. Thus, if a labourer inconsiderately lift his shovel but an inch or two more than is necessary to throw its load into his barrow, although the exertion of force is trivial in each instance, its repeated occurrence during the whole day, will produce at its conclusion a very sensible difference either in fatigue or in the amount of the work done. Napoleon is said to have remarked of Laplace, when he was Minister of the Interior, that he was too much occupied with considering *les infiniment petites*. To dwell upon small affairs which are isolated, is not the province of a statesman ; but to integrate the effect of their constant recurrence is worthy of the greatest.

One of the most important processes in all inquiry, is to divide the subject to be considered into as many different questions as it will admit of, and then to examine each separately, or in other words to suppose that each single cause successively varies whilst all the others remain constant.

But this most obvious doctrine of common sense

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has frequently been contested in questions of economical science, and has been often characterized as theoretical, and as entirely inapplicable to the affairs of life. It is certain that very little progress can be made in any subject without this aid, and it is hopeless for those whose minds are incapable of mastering the simpler questions, ever to institute successfully an investigation into their united action.

A familiar illustration will explain this better. Two men are making an excavation, removing the earth in the usual way with spades and wheelbarrows.

One of these men, Q., does more work than his companion P., and if an inquiry is made, Why is this so? the usual reply would be that Q. is either stronger, more active, or more skilful than P.

Now it is the third of these qualifications which is the most important, because if Q. were inferior even both in strength and in activity, he might yet by means of his skill perform a greater quantity of work without fatigue.

He might have ascertained that a *given* weight of earth raised at each shovelfull, together with a certain number of shovelfulls per hour, would be more advantageous for his strength than any other such combination.

That a shovel of a certain weight, size, and form would fatigue him less than those of a different construction.

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That if its handle were two or three inches longer than he required, its additional weight would at the end of the day have been uselessly lifted many hundred times.

That if each spadefull of earth were lifted but an inch or two above the barrow beyond what was necessary, a still greater waste of force would arise.

That if the barrow itself had its wheel at a distance beyond the centre of its load, it would be more fatiguing to draw.

That if the barrow had upright sides, it would require more exertion to turn out its load than if its sides were much inclined.

Thus although Q. might have less strength and less activity than P., he might yet by skill and practice, have arrived at some combination of these tools which should enable him with less fatigue to do more daily work than P.

But in order to have arrived at this degree of skill, Q. must when a boy have been taught to examine *separately* the consequences of any defect or inconvenience in the parts of the tools he was to use in after life, or in the modes of using them. If not so taught, he must have arrived at the same knowledge by the slower and more painful effort of his own reflections.

In either case he would be able to communicate his knowledge to his friends or his children; and if circumstances induced or obliged him to enter upon

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a new trade, he would naturally apply those principles to his new tools. Indeed, whatever subject might be presented to a mind thus trained, such habits of inquiry would most probably be applied to its examination. Thus, by the early education of his reasoning faculties on the trade by which he is to subsist, he would not only render his own labour more productive, but would have his mind better prepared for the reception of other truths.

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## CHAPTER II.

### ERROR RESPECTING THE INTERCHANGE OF COMMODITIES.

THERE exists in society a widely-spread error relating to the very principle of that interchange of property between individuals which is usually called a bargain. It is almost always supposed that one party is a gainer whilst the other is a loser. Indeed, by those whose reasoning on the subject has been limited to this single view of the question, it is with some plausibility maintained, that since the quantity of the commodities interchanged is in no case augmented by the bargain, the gain of one party can be accomplished only by an equal loss on the part of the other.

The insufficiency of this reasoning depends upon the truth of the principle that each party, being the best judge of the pleasure or advantage he can derive from the possession of a thing, *himself* decides that in his own case it will be increased by the exchange.

It may, however, be asked, How does it happen

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that the sum of two commodities so exchanged has a greater value after the exchange than before? or in other words, Whence has the profit arisen?—is there any third party at whose expense it has been acquired? The answer is—that there is another source which almost always either directly or indirectly contributes towards this profit. The advantage is most frequently won by industry and knowledge from nature herself.

§ The following illustration, which happens also to be a tolerable approach to truth, will explain this principle more clearly :—

It is found by experience that the upper-leather of Boots made in France, is better and more durable than the upper-leather manufactured in England. On the other hand, it is found that the leather prepared in England for the soles of boots is less permeable by water, and more durable than that made in France.

Let us suppose that in each country a pair of boots will endure twelve months' continual wear ; after which time they are thrown aside.

In England the destruction of the boots will arise from that of the upper-leather, whilst in France it will be caused by that of the sole. Let us also suppose that the upper-leather of France will wear three months longer than the French soles, and reciprocally that the soles of England will wear three months longer than the English upper-leather.



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Under these circumstances, it is clear that if the inhabitants of each country insist on making their boots *entirely* with the produce of *their own* tanneries, the average duration of a pair of boots both in France and in England will be twelve months.

Let us assume, for the sake of simplicity, that in each country the upper-leather and the soles have the same value. Then it is equally clear, if England were to give to France a million pair of soles in exchange for a million pair of French upper-leathers, that one million of the inhabitants of each nation would find their boots last during fifteen instead of twelve months.

This prolonged duration of their boots would not have been acquired by any sacrifice on either side: the exchange is here for the common and great advantage of both.

This probably arises from the joint action of many causes. The animals which in each country supply the hides, may either from breed, from food, or from climate be best adapted to produce that kind of leather in which each country excels. The water, the bark, or the climate peculiar to each country, may then contribute its share to the same effect. Again, the industry, the skill, and the knowledge of the people employed, as well as the character of the population and the distribution of its capital, may also have its influence on these results.

If we pursue this illustration one stage further,

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it will appear that it is our interest not only that we should make these exchanges with France, but that she should also make exchanges with other countries than our own.

Let us suppose that France, having a larger population than England, required for its annual consumption two million pair of boots, and also that she possessed no other commodities which we required. Under these circumstances there could be no further direct interchange of leather, and France would possess a million pair of upper-leathers beyond our demand. But it is clear that if France could exchange these upper-leathers for the wools or any other produce of Germany which we might require, she would not only gain the additional duration of three months for her own extra million pair of boots, but would also enrich us by the advantage which we should derive from the exchange of the strong hides of England for the produce transmitted to us from Germany.

§ The general result of all those inquiries of which only the slightest sketch has now been attempted, is that—*the free and unlimited exchange of commodities between nations, contributes to the advantage and the wealth of all*;—that this benefit arises from no sacrifice on the part of one nation for the profit of another; but that the sum of the productive powers of man is by these means, without any increased labour, largely augmented throughout the world;—that this increment is won partly by