J. H. Clapham
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see below: A. C. Pigou: *A Reply*; J. H. Clapman: *A Rejoinder*

OF EMPTY ECONOMIC BOXES

PICTURE an economist, well-educated in the dominant British school, going over a hat-factory. On the shelves of the store, the first room he enters, are boxes containing hats. On the shelves of his mind are also boxes. There is a row labelled Diminishing Return Industries, Constant Return Industries, Increasing Return Industries. Above that a dustier row labelled Monopolies (with discrimination of three degrees) in Diminishing Return Industries, Constant Return Industries, Increasing Return Industries. On top again he can just read the dockets, Taxes on Monopolies in Diminishing Return Industries—and so on. He is aware that these boxes are not very prominent on the shelves of some economists of whose mental furniture he generally approves; but he received them from his masters and he has seen them handled with beautiful ingenuity by his friends. Yet from all his reading and conversations he cannot recall a scene in which anyone opened the boxes and said, with authority and convincing evidence, "Constant Return Industry, hosen; Increasing Return Industry, hats," or used any like words. Nor can he think of an industrial monograph in which profitable use was made of the Laws of Returns in commenting on the things of life. Perhaps he has himself tried to write a little monograph and remembers how, doubtless for lack of wit, he made of them no use; but how for this no one ever blamed him.

He takes down, in memory and when he gets home from his shelves, *Industry and Trade: A Study of Industrial Technique and Business Organisation*, with its nearly nine hundred pages packed full of the things of life. Two references to Constant Returns—one in a footnote—and a handful of references to Diminishing and Increasing Returns *im Allgemeinen*, not so far as he can find in close relation to the facts of those British, French, German and American Industries of which the great book has taught him so much: these seem to be all. He tries *The Economics of Welfare* to find that, in nearly a thousand pages, there is not even one illustration of what industries are in which boxes, though many an argument begins—"when conditions of diminishing returns prevail" or "when conditions of increasing returns prevail", as if everyone knew when that was.

The difficulty of supplying illustrations had been brought home to him that day in the hat factory. Whilst wandering among hollow copper cones to which hat-stuff miraculously adhered, shaping and pressing appliances, and dye vats, he had wondered—recalling the words with difficulty—whether " the increment of product due to the increase by a unit in the quantity of resources occupied in producing " hats is smaller (diminishing returns), or greater (increasing returns), " the greater is the quantity of resources so employed." [1] How should he conceive his unit of resources? How his increment of product? No one had given him any help here. Must he fix on a standard hat or a standard quantity of standard hat-stuff? It is physical output, the Great Analytics repeat, with which these Laws deal; so something of the sort seems necessary. He appreciates the wisdom of talking not of hats but of commodities.

Or how is he to conceive of " an industry "? Is it a national industry? The Great Analytics seem to assume this; though they are not perfectly explicit. But are they entitled to assume it? Ought he not somehow to take into account conditions in that place—now in Czecho-Slovakia—whence came the " Austrian velours hats " of which he hears so much among the hat factories of Denton? Discouraged, he falls back, most reluctantly, on generalities. As the world's population is still growing, presumably more units of resources, however conceived, are in fact being turned to hat-making. But only the most searching and difficult realistic inquiry could, he feels sure, even suggest the conclusion that, in this industry at this time, each " dose " of manufacturing resources means more standard hats.

Can the diminishing returns side help? Hats; chief raw materials, coal, rabbits' fur, shellac, leather for the inside band and pulp for the box. Coal seems easy; and an approximate solution there will help in so many other industries, in some of which the value of the product is thirty per cent. fuel cost, or more. To assert that the produce of mines conforms to the Law of Diminishing Returns is, he knows, " misleading." [2] But if the one raw material common to all industries is not to be brought within the scope of the Laws, all hope of dragging them out of the realm of the categories must be abandoned *in limine*. So the risk of misleading must be shouldered.

Nature's response to the miner is notoriously reluctant. A time must come in the history of the planet, as a time comes in the history of every pit, when equal successive " doses " of

[1] *The Economics of Welfare*, p. 120. [2] Marshall, *Principles*, p. 168.

resources will yield smaller physical returns. Economics, however, is not concerned with geological time; nor the Laws of Returns, if he has rightly apprehended them, with individual pits. The industry is the unit. For the moment he will think of a national industry, an old national industry, that of Britain. Have the new large-scale applications of resources, those great pit-sinkings on the Doncaster extension of the Yorkshire coalfield which the war interrupted, have they the effect of increasing or of only keeping constant the yield of coal "per unit of resources" in Britain? Or, in spite of their undoubted efficiency, is the return per unit for the whole industry actually diminishing, because elsewhere the working out of pits is rendering the successive "doses" applied to them less efficient? He does not know; but it seems not impossible that an approximate answer might be worked out—with a gigantic reservation which he sets aside for further thought.

That coal in Britain is being produced under conditions of diminishing returns is quite possible; but this is one of the cases in which we are least entitled to adopt a narrow national standpoint. One could hardly err in assuming that in Upper Silesia, or in the Transvaal, or in many parts of the United States the reverse is true; and as the world is fast becoming a single market for coal, and coal-mining a single world-industry like wheat-growing, any thorough inquiry would have not only to balance the virgin coal of Doncaster against the well-worked Lancashire field, but Britain against America or even against that wonderful coal-field through which, they say, the upper Yangtse-Kiang cuts its gorges. So far as our economist knows the work is not yet begun.

After coal, rabbits' fur: an awkward case: a joint-product too. Nature shows no reluctance to supply mankind with rabbits; but as a crop they compete with others. The rabbit-skin industry is distributed between Hampshire warrens, Belgian hutches, and Australian back-blocks. There is system in it, at least in the hutches and on the back-blocks; but its organisation, its internal and external economies, are elusive. The puzzled economist has no idea, and no notion how he shall begin to form an idea, whether it is or is not carried on under conditions of diminishing returns. Of the leather for the hat-bands he is more disposed to hazard a guess that diminishing returns prevail; but it is a guess, and there are all the problems of the joint-product and the sources of supply (some in old countries and some in new) which faced him when considering the rabbits.

Shellac and pulp for the boxes are more hopeful. From what he has read of the shellac "industry" and the lac insect he suspects diminishing returns. Things picked up in forests are apt to elude with greater and greater success intensive efforts to pick them up. But stay—is there any "cultured" shellac? That is a thing to be looked into; for, in the slightly similar case of wild and plantation rubber, he suspects that the transition from the wild to the cultured product marked a transition from diminishing to increasing returns upon each "unit of resources" devoted to rubber production. It looks almost as if a proof of increasing returns in rubber planting might be established statistically for the period 1905–22: it is, of course, the simple case of an organised large-scale industry on virgin soil, a Ricardian, or perhaps we should say a Careyite, rudiment. Shellac is not so easy. With a confession of ignorance, coupled with a strong guess of diminishing returns, he passes to pulp, the most hopeful of all his raw materials.

Common knowledge of the wastage of the world's timber—which was being treated rather as a stock, like coal, than as a crop, like rubber—supported by some study of timber price movements as compared with other price movements before 1914, did suggest definitely that "units of resources" applied to forest exploitation were yielding smaller physical returns. Whether this is true of wood-pulp is less certain. There the economies of an organised industry, the increasing returns tendency, have to be set against Nature's very obvious reluctance to supply mankind with timber indefinitely on the stock system. But it is likely that the pulp industry also, thanks more to human carelessness than to the niggardliness of Nature, is working under conditions of diminishing returns. Provisionally, and with hesitation, our economist was just about to conclude that the cardboard of his hat-boxes shows clear signs of Nature's reluctance to meet man half-way, when someone reminded him that this particular cardboard was made not of wood-pulp but of straw, ropes' ends, and the worn-out covers of railway wagons. Vegetable materials, no doubt, and against all such a suspicion of diminishing returns lies; but may not the improving organisation of the marine-store dealers and other handlers of "junk" come in on the other side? New processes have got between him and Nature: a new, long and none too hopeful inquiry into fact lies before him. He must, if honest, admit ignorance of the class of "returns" under which this cardboard is made. Finally he must balance all these uncertainties and ignorances on the

" diminishing " side against the equally stubborn ignorances—all of which there has not been space here to tabulate—on the " increasing " side. He leaves the factory with no formed opinion about the proper economic box for hats.

It may be said that the industry is not typical of industries generally. Certainly there is a special lack of decent organisation for the production of some of its raw materials and great difficulty in hitting on a representative finished product. But the same is true of many other trades; and incidentally it has been shown, or suggested, that coal itself cannot be boxed confidently. No doubt it is easy to take extreme cases on the " increasing " side and box them. Meccano Ltd., no doubt, are working under conditions of increasing returns. So, one supposes, are the Ford establishments and probably the car industry generally; but whether or not well-established industries, say textile machinery or locomotives, are working under decided conditions of increasing returns would be very difficult to determine. True, it seems most unlikely that mechanical industries with mineral raw materials, in the present state of the world's mineral resources, are producing under " diminishing " conditions; but no more can be said with any confidence. Wherever animal or vegetable materials are involved the element of uncertainty is greatly increased. And it was for these cases in particular that the conception of the balance of forces, man's organisation *versus* Nature's reluctance, was worked out. A strict interpretation of diminishing returns, as we know, excludes the mineral stocks. Then consider wool.

It is no use discussing " woollen cloth "; for there is no such thing. You might as well discuss a commodity. But there are standard products of the industry, reasonably uniform and regularly quoted. Take combed wool, " tops." If any problem in " returns " involving organic matter is soluble, that of 64's Botany tops should be. The wool is, by definition, all Australian; and if perhaps now and then some River Plate or New Zealand wool gets into the tops, that too is new country wool. " In the production of wheat and wool " (the tendency towards diminishing returns) " has almost exclusive sway in an old country." [1] The converse is no doubt true of a new one. But is Australia still " new "? There is keen competition between agricultural and pastoral interests and, in some districts, between sheep and cattle. The districts in which the fine merino wool used for 64's can be produced to perfection are limited; and as the supply

[1] Marshall, *Principles*, p. 319.

has grown but little, in spite of steady demand, it is likely enough that "conditions of diminishing returns" prevail. But just how the situation is now to be described, I do not know. A monograph, as yet unwritten, would be illuminating but might not be decisive. At present we are not justified in stating that Botany (*i. e.* fine merino) wool is being produced under the sway of either of the returns tendencies. On the other hand we are, I think, justified in stating that the tendency to increasing returns is not working strongly on the manufacturing side. The combing industry is highly organised and localised to an astonishing degree. Apart from combs run by some spinners, the combing plants are mostly large. Fresh ones are seldom set up, and it is unlikely that the building of new mills or the extension of those now existing would increase the efficiency of the industry disproportionately to the effort expended. This is almost a verbal repetition of what Dr. Marshall wrote long ago about the production of blankets. Supposing that Botany wool is, in fact, produced to-day under conditions of slightly diminishing returns, it is conceivable that 64's Botany tops are being turned out very near the mathematical point of constant returns. But we do not know.

Constant returns, it may be observed in passing, must always remain a mathematical point, their box an empty one. It is inconceivable that a method can ever be devised for so measuring these real but infinitely subtle and imponderable tendencies towards diminishing and increasing returns that someone will be able to say, Lo, here a perfect balance. If this is so, constant returns industries may be relegated finally to the limbo of the categories, in company for the present with such still disembodied phantoms as the "commodity whose elasticity of demand is unity."

In the passage where Dr. Marshall discusses blankets occurs the reservation referred to above as gigantic and set aside for further thought. The improvements in efficiency arising from the increasing size of an industry, to which Dr. Marshall attributes increasing returns, are, as I read him, not to include notable inventions, perhaps not inventions at all. They are improvements in organisation only. Referring to the blanket trade he writes, "an increase in the aggregate volume of production brings some new economics, but not many," because the trade is "already on so great a scale that any new economics that (it) may attain are more likely to be the result of new inventions than of improved organisation." I think Professor Pigou endorses this distinction between invention and organisation, but I am

not quite sure; he is less concrete in his treatment than Dr. Marshall, further from the clod and much further from machinery. The distinction, important as it is and clarifying of pure thought, discourages the student not of categories but of things. For, when trying to box an industry with the increasing docket, he must strive to think away that part of any additional output, coinciding with a fresh " dose of resources," which is due to invention, and concentrate on the part due to size and organisation only. Suppose he has just found out—it would be hard enough, perhaps not possible, but conceivable—that the returns to the expenditure of resources in sinking of coal-pits near Doncaster are such as to show that even the British coal industry is still in the " increasing " stage; and that then someone tells him (I fancy it is true) that these pits would never have been sunk at the price in " resources " but for the modern invention by which loose and water-logged strata above the coal-measures are frozen artificially to facilitate sinking. Can he, like a schoolman, put this aside as an *accidens* and concentrate on the pure *substantia* of the growing industry apart from the invention? He is not tempted to try. If he were, quite certainly the boxes would always remain empty. Should the laws ever be rescued from the limbo of the categories, it could only be by treating industries as they are and lumping in inventions. Professor Pigou's definition quoted above would, I think, permit of this. You can pack much into the phrase, " a unit in the quantity of resources." It may prove difficult to suggest a concrete measure for the " unit of inventiveness," but it should not be much more difficult than measurement of the " unit of normal managerial capacity," which is obviously included in Professor Pigou's composite unit.

Perhaps some analytic, great or small, having read so far with impatience will be muttering quite loud, *connu, farceur!* Was it not obvious to you that we did not pretend to have set up measured units of managerial capacity, units of capital, and units of labour, compounded into a joint-unit of resources? Of course there are endless practical difficulties in fixing on standard units of product for particular industries and correlating them with the application of units of resources. Did not the rarity of illustrations in our discussion of " returns " indicate what we were doing? A standard hat is not a mathematical concept. We are generalising the bewildering detail of industry. Do you admit the logic of the conception of the laws of returns? Yes?

Well, we are building a framework into which we hope facts may in time be fitted. If those who know the facts cannot do the fitting, we shall regret it. But our doctrine will retain its logical—and, may we add, its pedagogic—value. And then you know it goes so prettily into graphs and equations. Besides, in the history of thought analysis has often outrun verification.

The answer to such a statement of the case depends, *first*, upon the measure of hopefulness or despondency with which one contemplates the task of translating the theory into the facts of those industries which one knows best; *secondly*, upon one's estimate of the final utility of such a translation if it could be made; and *thirdly*, upon one's personal opinion of the consequences of the outrunning of verification by analysis in Economics. Taking the last point first and speaking in the first person, as in such a case one must, I think a good deal of harm has been done through omission to make it quite clear that the Laws of Returns have never been attached to specific industries; that the boxes are, in fact, empty; that we do not, for instance, at this moment *know* under what conditions of returns coal or boots are being produced. If unwary, one might read *The Economics of Welfare*, a book which from its title would not appear to be an essay in "pure economics," without apprehending this; and I suspect that many students do so. I myself did not appreciate how completely empty the boxes were until I had given a number of public demonstrations with them. And if more acute minds are not likely so to be misled, the rank and file surely are. Unless we have a good prospect in the near future of filling the boxes reasonably full, there is, I hold, grave danger to an essentially practical science such as Economics in the elaboration of hypothetical conclusions about, say, human welfare and taxes in relation to industries which cannot be specified.

Next, supposing we did, after much labour, ascertain definitely that coal in England was being produced under conditions of slightly diminishing and 64's Botany tops under conditions of slightly increasing returns—what would be the utility of the knowledge, apart from the satisfaction of a legitimate scientific curiosity? Professor Marshall has stated that "*other things being equal*, the Finance Minister should press on products of Decreasing Return industries rather than on products of Increasing Return industries," [1] and there is a considerable literature, with few illustrations, on the working of taxes upon commodities under different assumptions as to returns. But I think we may take it that the italicising of the "other things being

[1] *Industry and Trade*, p. 405 n.

equal" is a scholarly reminder that this is not a bit of political advice; for it is hard to think of cases in which other things would be equal, since Diminishing Return industries, if we can lay them by the heels, are likely to prove nearer the raw material, so to speak, and so less eligible for taxation, than Increasing Return industries. If not a safe guide to taxation, would the knowledge affect social, industrial or commercial policy? At the moment I can think of no advice which I should give to a working wool-comber, top-maker, spinner, merchant or reformer of social conditions in the worsted trade, as a result of the decision that 64's Botany tops were being produced under conditions of slightly increasing returns. Long before scholars had established that British coal was being produced under conditions of slightly diminishing returns, the resultant price rise relative to the price in increasing return areas would have stimulated organisation and invention to restore at least a state of constant returns, were that in any way possible. In all these matters the economist is, willy-nilly, an historian. The world has moved on before his conclusions are ripe.

And with how much hope does one face the establishing of these conclusions? The instances referred to so far have not been very encouraging. Looking backwards over long periods the task can be approached with some hope, provided one does not seek too great precision, does not, for instance, try to separate the effects of organisation from those of invention. The fact that the iron-work required to build a church cost about as much in sterling in 1913 as when Sir Christopher Wren was estimating for City churches, after the great fire of London,[1] alone indicates an enormously increased return to invention and organisation combined during the intervening two centuries and a half. But to prove that any standard grade of iron—No. 3 Cleveland pig or crown bars, let us say—has been turned out since the war under any particular condition of returns is a different matter. I can at present see no way of giving reality to the "unit of resources": though that by no means proves that there is no way. If it were given reality, some appreciable period of time would be necessary during which successive "units" would have to be applied to the industry, and the physical outputs measured. The allowance of time might have to be so long as to "make history" of the inquiry: its results might be true only of yesterday. Again the experimental difficulties appear, though they may not prove to be, insurmountable. No one, so far as I know, has begun to attempt to surmount them.

[1] W. G. Bell, *The Great Fire of London*, p. 282.

If it is judged worth while to make a serious and concerted effort to fill the boxes—of which I am doubtful—a beginning might be made with some of the simple industries which it is customary to assume are working under conditions of diminishing returns. Do we really know that wheat, world wheat, is produced under those conditions? Or wool, or cotton? Some rough suggestions have been thrown out above as to timber, rubber and coal: the two first are the most hopeful. Before we know how much reluctance on the part of Nature we have to overcome, it is rather vain to speculate on the extent of our achievement in overcoming it and establishing conditions of increasing returns. Nature's reluctance varies presumably with the proportions of virgin and non-virgin soil, forests, coal measures and so forth to the total quantity of each being exploited at a given time for the production of a given raw material or food-stuff. In special cases, of which rubber may be one, she may for the time being be not reluctant at all. Easy generalisations about the Law of Diminishing Returns being necessarily true, because if it is not you might feed the world from a square yard, will help little in the discussion of these world-problems.

As to Increasing Returns: if we are to restrict the conception as, I believe, Dr. Marshall does, to the increased efficiency resulting from the improved organisation which generally accompanies an increase of capital and labour in any industry, or in industries in general,[1] to the exclusion of the efficiency flowing from invention—and a very good case can be made out for such restriction—then, I think, we should on principle avoid even the suggestion that we know that particular industries come into the "increasing" category, because we never can know what proportion of their efficiency is due to organisation resulting from mere size and what to invention. This is not a denial of the reality of increasing returns in this sense, only a denial of their measurability. If, on the other hand, we widen the conception as suggested above so as to cover all inventions, we can arrive at certain tolerable historical results; but, as I think, we shall be permanently held up by "experimental" difficulties in dealing with the present and, *a fortiori*, with that near future which is so particularly interesting to the working economist. If I am wrong, and there are ways over any or all of the difficulties, which someone can point out, these mainly destructive notes may have constructive uses.

J. H. CLAPHAM

[1] See the definition in *Principles*, p. 319.

EMPTY ECONOMIC BOXES: A REPLY

DR. CLAPHAM'S entertaining paper on *Empty Economic Boxes* in the September issue of the ECONOMIC JOURNAL is evidently designed to provoke one of his friends, "some analytic great or small," to reply. For myself I am inclined to suspect that the boxes labelled "analytic" and "realitic"—if that is the corresponding term—among economists are themselves empty, and that nobody in the world really falls into either category. Still "analytic" is a charming word and, for the purposes of this paper, I am ready to accept it as a label. In revenge, however, for letting myself be boxed in this way I claim the right, proper among friends, to indulge in whatever "brilliances" at Dr. Clapham's expense the spirit of controversy may whisper to me.

The substantial content of his paper is contained in the following propositions. (1) There are difficulties in the *conception* of a rate of returns in industry, particularly of a rate of increasing returns. (2) There are difficulties in deciding which particular industries are at the present time being conducted under conditions of increasing or conditions of diminishing returns—difficulties which keep these economic boxes empty. (3) If we could fill the boxes, very little practical good would come of it. (4) Therefore the said boxes are useless, dangerous and ought to be abolished. The first of these propositions is obviously true. Since, however, Dr. Clapham does not display, or profess to display, any difficulties in the conception of returns additional to those that have been familiar to economists for the past quarter of a century, nothing further need be said about it. In the following pages, therefore, I shall confine attention to the other parts of his paper.

Let us begin by clearing the ground. There are two broadly distinguished sorts of knowledge: "pure" knowledge about implications, such as is sought in mathematics and logic; and realistic knowledge concerned with a subject-matter presumed to be actual, such as is sought by physicists. Within that second sort of knowledge must be further distinguished knowledge that cannot, and knowledge that can, give us direct help in the practical

conduct of affairs. This second distinction seems to be somewhat blurred in Dr. Clapham's mind: with the result that it is not clear how far his antipathy to the categories of increasing and diminishing returns is due to his belief that they cannot be given a concrete filling, and how far to his belief that they cannot show us the way to card wool or impose taxes. Thus, I cannot gather from his article whether or not he would enjoy the contemplation of these categories, provided they were given a complete concrete filling *and yet* could not help practice at all. This woolliness in his critique makes the task of reply a little embarrassing.

If he is to be interpreted literally, his argument is that the analysis of increasing and diminishing returns is not worth pursuing, because, even if these economic boxes could be filled, no help would be given thereby to practice. Let us grant, for the sake of argument, that the analysis does not touch practice at all. The conclusion that it is not worth pursuing does not follow. Dr. Clapham, as a historian, is debarred from contending that the only knowledge which has value is knowledge which can guide practice; for by far the greater part of the knowledge which history aims at is totally irrelevant to practice. Hence, knowledge may have a value for its own sake. But knowledge of *implications* is just as much knowledge as knowledge of *matters of fact*. That, *if* certain conditions as to increasing or diminishing returns prevail, and *if* a tax of so much is imposed on a given article, such and such an effect will follow, is a piece of truth, just as it is a piece of truth—if it is one—that a certain English king died from a surfeit of lampreys. The historian is interested in matters of fact; but the logician is interested in implications. What right has the one to condemn the other? On what metaphysical or other basis is he entitled to lay it down, that knowledge of the form, "If X, then Y," is inferior to the knowledge of the form, "In the year 1600, X"? There are many empty boxes, in Dr. Clapham's sense, in the kingdom of pure mathematics: will he invite the mathematicians to abandon them and join in his researches about lampreys? This kind of answer to the contemner of "useless knowledge"—as followed by other people—is, I think, a perfectly legitimate one. Nevertheless, it is not one that, in the present connection, I wish specially to stress. For I do not myself judge that a knowledge of implications *of the type that pure economics can provide* has, in and for itself, any large value. To this extent I am really at one with Dr. Clapham, though, since I see no way in which a person who takes

a different view can possibly be confuted, I am less willing than he appears to be to dogmatise on the matter.

I suspect, however, that, though Dr. Clapham in words makes his valuation of different parts of economics depend on their practical usefulness, he would, in thought, be content with any *schema*, whether it had a bearing on practice or not, provided it could be given a realistic content. For I cannot imagine that a person, who thinks it worth while to study the economic conditions of the past for their own sake, should think it not worth while to study these conditions in the present except where it can be shown that practical applications result. Moreover, I am confirmed in this view by the curious complex from which Dr. Clapham appears to suffer in connection with general terms. The word "commodity," for instance, is a red rag to him. He prefers to talk of hats, not appearing to realise that, if I wish to say something which is true, not only of hats, but also of gold watches and of onions, to express the proposition in terms of hats alone is not to express it fully. When this complex is developed a little further, he will probably rebel at the statement that two and two make four, and will insist on substituting for it the statement, which is also true but is not the same statement, that two hats and two hats make four hats! This, however, is by the way. I merely refer to it because it strengthens a little my view that, in spite of his words, it is realism rather than practical usefulness that Dr. Clapham wishes to extol.

If I am right in this view, the point at issue is whether the concepts of increasing and diminishing returns are instruments of service in the construction of a realistic economic science. Dr. Clapham appears to hold that, provided, as boxes, they cannot be filled, it is self-evident they can serve no purpose of this kind. In that I venture to suggest that he is mistaken, that he has, in fact, misunderstood altogether the nature of the work that he is belittling. A central problem of economics, from the time of Adam Smith downward, has been to disentangle and analyse the causes by which the values of different things are determined. In the course of the prolonged attack that economists have made upon this problem it has been found convenient to distinguish influences acting from the side of demand and influences acting from the side of supply; and it has been found further, on the side of supply, that the relations between changes in aggregate output and changes in cost per unit differ according to the nature of the article and the period of time that we have in view. In studying the relation between aggregate output and

cost we naturally distinguish the group of conditions under which cost increases as aggregate output increases from the group of conditions under which it diminishes as aggregate output increases. Since it so happens that alterations in demand will produce effects of a different kind, and not merely of a different degree, according as one or other of these groups of conditions prevail, we are led to give the distinction between them a certain prominence. But the distinction itself is not the fruit for which we have been labouring. It is a mere incident in our general analysis of the problem of value—an analysis in which are brought to light the complex inter-relations of internal and external economies and those deep-seated difficulties, obscure to all economists before Dr. Marshall wrote, connected with the element of time. It is not to be judged by itself in isolation from the general analysis. To take the categories of increasing and diminishing returns out of their setting and to speak of them as though they were a thing that could be swept away without injury to the whole *corpus* of economics is a very perverse proceeding. It would be easy enough to drop the names; but does anybody seriously imagine that we could have any understanding at all of the influences governing economic values if the *fact* that aggregate output and supply cost have varying relations to one another were ignored?

But I am anxious to return to the question of practical usefulness, because I personally am inclined to go further in this matter than I think Dr. Clapham himself would go. Even a thoroughly realistic economic science would not, in and for itself, make any great appeal to me. Practical usefulness, not necessarily, of course, immediate and direct, but still practical usefulness of some sort, is what I look for from this particular department of knowledge. Without that, if there were hope of light alone, and not of fruit, from economic investigation, I should not trouble much about it. It is here, therefore, that Dr. Clapham's paper chiefly interests me. He maintains three separate things: first, that his economic boxes, so long as they are empty, cannot have practical usefulness; secondly, that, even if they were filled, they would not have practical usefulness; thirdly, that they cannot be filled. I proceed to consider these three contentions in turn.

The first of them I have already partly answered. These boxes, as he calls them, are not merely boxes; they are also elements in the intellectual machinery by which the main part of modern economic thought functions. If then it be granted that this thought as a whole is able to render any practical service—and, in face of the

enormous range of problems now confronting Europe in which the issues involved are largely economic, this will scarcely be disputed—these particular elements in that machinery cannot be singled out from the rest and condemned as useless; they are an organic and inseparable part of that machinery. But there is a further consideration of a more direct kind. Even regarded as boxes, and empty ones at that, the categories of increasing and diminishing returns are not mere ornaments. Knowledge about them cannot, indeed, on the hypothesis of their eternal emptiness, help us in a positive way, but it can help us a great deal in a negative one. It enables us to discover with absolute precision what assumptions are implicit in the statements about economic causation (upon which action is often based) that politicians and other such persons are accustomed to make for the guidance of the public. When we are informed that a tax always raises the price of the taxed article by the amount of the tax, we know that our informant, though himself probably unaware of it, is tacitly assuming that all articles are produced under conditions of constant return. We know, therefore, that his statement is almost certainly untrue, and we also know what information we should need to have about any article subject to tax, in order to prophesy what the result on the price, at various intervals after the tax was imposed, would be. Dr. Clapham will hardly contend that this is unimportant. He will hardly deny that science may help practice by exposing the falsehoods of charlatanry as well as by itself discovering truths.

The second contention is that, even if they could be filled, knowledge about these boxes would have no practical usefulness. In discussing this contention I am again placed in something of a difficulty by Dr. Clapham's failure to clarify his own meaning. Of course, merely to know that a particular article—article, being a term used by shopkeepers, sounds more " realistic " than commodity—is being produced under conditions of increasing or diminishing returns is to know very little indeed about it. It is on a par with knowing merely that a man's temperature is above or below normal. To get any large and important guidance for practice we must know, or, at all events, we must have some rough general idea, as to *how much* above or below the normal it is. If we knew that the hat industry was being conducted under conditions of increasing or of diminishing returns, we should be able, it is true, to say *something* more about the effect to be expected from the imposition of a tax on hats than we can say now; we should be able to say, that is, whether, *other things being equal,*

a given tax would cause the price to go up by more or by less than the amount of the tax. But this is all we should be able to say. In order to get a definite result—to be able to say by how much, in actual pounds, shillings and pence, prices would go up,—we must know a great deal more than this. We must know the exact shape of the relevant part of the supply curve for hats and also the exact shape of the relevant part of the demand curve; in more general, if less exact, terms, we must know the numerical values of the elasticities of supply and demand for quantities of hats in the neighbourhood of the quantity that is actually being produced, and the relation of these elasticities to the passage of various intervals of time. Had Dr. Clapham pointed out that to know that a particular article is being produced under conditions of increasing or diminishing returns is not to know these things, and is, therefore, of little practical use, I should have agreed with him. But this is not his line of argument at all. He speaks as though increasing returns is one definite thing and diminishing returns another, whereas, in fact, each of these terms covers an infinite number of different things. The boxes between which the "analytics" are interested to draw distinctions are not, as he evidently supposes, the bulky valises displayed in their shop windows, but an intricate collection of little cases inside these, each labelled with a legend of the form "η lies between a and $(a + \Delta a)$ and e lies between b and $(b + \Delta b)$." Dr. Clapham does not say in so many words that the filling of these little cases would have no usefulness for practice, because he does not seem to realise that, inside the valises, there are any little cases. But the form of his argument suggests that, if he had realised that fact, he would have said this. At all events, in rebuttal of his view I wish to argue, not that the filling of the boxes would serve practice a great deal, but only that the filling of the little cases would do so.

Consider then his argument. For believing that the filling of the boxes would be of no appreciable use he adduces two reasons. First, he would not thereby be enabled to give any more advice than he can offer now to a manufacturer of woollen goods in the conduct of his business. Secondly, the information available to governments through the filling of the boxes would not, *by itself*, enable them to reach any political decisions. To the first of these reasons the answer is that it is not the business of economists to teach woollen manufacturers how to make and sell wool, or brewers how to make and sell beer, or any other business men how to do their job. If that was what we were out for, we should,

I imagine, immediately quit our desks and get somebody—doubtless at a heavy premium, for we should be thoroughly inefficient—to take us into his woollen mill or his brewery. The second reason is a remarkable one. Dr. Clapham has learnt from the *Principles of Economics* that, if we knew, as between two articles, that one was being produced under conditions of increasing and the other under conditions of diminishing returns, we could draw inferences that were relevant to the comparative effects on social welfare of putting taxes on the one or the other of them. Because there are also other considerations relevant to that problem, Dr. Clapham considers that this knowledge would be useless ! What is there to say of reasoning of this quality ? It is as though Dr. Clapham, in choosing between two suits of clothes (he will forgive the horrible suggestion that he might buy such things ready-made !), should refuse to inquire which of them will fit him best, because there is another consideration also relevant to his choice, namely, the amount of money that they respectively cost !

There remains the contention that the empty boxes cannot, in fact, be filled. Here I must point out that, had Dr. Clapham realised what the issue really was, he would have been able to strengthen his case very considerably. For, if it is difficult to decide whether a particular article falls into the increasing returns box or the diminishing returns box, *a fortiori* it is difficult to decide into which of the little cases inside these boxes it falls. I am very far from wishing to underrate the difficulty of this task : indeed I have myself more than once discussed and emphasised it.[1] None the less to declare, of a piece of work that has not yet been seriously tackled, that it is impossible, is, in my judgment, at least premature. Something, I believe, might be accomplished if economists would take counsel with leaders of business, expert in particular branches of production. Of course, if Dr. Clapham, or anybody else, goes to them and says, " My dear fellows, an ' analytic ' up at Cambridge wants to know if your industries obey the laws of diminishing, constant or increasing returns," no great illumination is likely to result. But, if he were to ask them to discuss the conditions, as regards the relation between aggregate output and cost, under which various important articles have been and are being produced,—which is really asking a great deal more—I for one do not believe that he would always come empty away. Nor need we rely only on the general judgment of people expert in particular industries. There is

[1] Cf., *e.g.*, *The Economics of Welfare*, pp. 8–10.

already available a certain amount of statistical material—and we may reasonably hope that this material will both grow in quantity and improve in quality—from which students with the requisite mathematical equipment may make rough deductions about the shapes of certain supply schedules. On the side of demand something on these lines has already been accomplished. On the side of supply the task is undoubtedly more difficult. But we need not conclude that it is impossible. The hope of which I have just spoken, that better statistical material may presently be available for study, thus making the inquiry more feasible than it has been hitherto, should itself forbid that. There is, indeed, a lion in the path; the fact that those people—with the towering exception of Jevons—who have the qualities required for conducting a detailed intensive study of particular industries and writing monographs about them, are not usually well versed either in the more intricate parts of economic analysis or in modern statistical technique; while the "analytics" lack alike capacity and inclination for these detailed studies. For this there is only one real remedy. We must endeavour to train up more men of the calibre of Jevons, who are equally at home in both fields. Till we can accomplish that, the next best thing, for those lesser persons who are moderately qualified for the one sort of inquiry and for the other, is to work together in combination, and not to waste time in quarrelling, perhaps on the basis of an imperfect understanding, with the deficiencies of one another's methods.

A. C. PIGOU

[For a rejoinder to this article by Dr. Clapham, see *Notes and Memoranda* below.]

The Economic Boxes

A Rejoinder [1]

By the courtesy of the Editor and of Professor Pigou I am allowed to append a few notes and comments. My object having been to elicit a reply, I am content to have succeeded and so will be brief. The preliminary sparring before the big blows are hit I will pass over, without denying that so good a sparrer as Professor Pigou "gets in." Neither he nor I think very highly of "pure" economic knowledge which is likely to remain "pure" indefinitely. We agree that a mere study of implications which is fully justifiable "in the kingdom of pure mathematics," or a mere study of facts in succession which may be justifiable in the kingdom of history, would not be justifiable as the main business of economics. I cannot tell him—nor in a similar case, I should imagine, could he tell himself—how much of my rudeness towards the boxes is due to (*a*) their emptiness and (*b*) their possible use-

[1] See Professor Pigou's article printed above.

lessness if filled. The emptiness is ground common to us both; an important fact, I think.

A word about "complexes." In form Professor Pigou's reference to them is only a sparring point, but I think it has importance. I admit the anti-commodity complex: Professor Pigou has found the right name for my complaint. I know that the term commodity is used in order that it may cover hats and gold watches and onions, and I constantly suspect that the user does not know whether the propositions which he is affirming as to commodities are true of either onions or gold watches or hats. The oftener he does it without an illustration the stronger grow my suspicion and my complex. The cure—in a friend's hands—is a series of illustrative footnotes.

This leads to a point of more general interest. "Dr. Clapham appears to hold that, provided as boxes they cannot be filled, it is self-evident that they can serve no purpose"—"as instruments in the construction of a realistic economic science." "In that I venture to suggest . . . that he has, in fact, misunderstood altogether the nature of the work that he is belittling." Professor Pigou then goes on to show the importance of the laws of returns, or some equivalent, in the whole theory of value, and says that to take them out of their setting is "a very perverse proceeding." I see no perversity in criticising part of a theory; but I was at first disposed to search for empty boxes in more parts than one. This space forbade. I have a fear lest a theory of value which should prove permanently unable to state of what particular and individual values some of its more important conclusions were true might in the long run be neglected by mankind. I fear also that a too constant thinking in terms of commodities may tend to blind "analytics"—to use the nickname as to whose imperfect applicability Professor Pigou and I are in fact at one—to this danger. It was solicitude for the theory of value, not indifference to its complex beauties, which urged me on.

Professor Pigou's argument about the negative use of the boxes, even if empty, is decisive within its range. It is one of the considerations which I had overlooked and which I am glad to have pointed out. "Dr. Clapham will hardly deny that science may help practice by exposing the falsehoods of charlatanry as well as by itself discovering truths." He will not; but he is very anxious that economic science should be able to do more, and that, where and in so far as it is at present unable to do more, it should make the fact quite clear.

I believe I was aware of the "intricate collection of little cases inside" my big boxes; although I seem to have written so carelessly that Professor Pigou can tell people that I "evidently suppose" that "analytics" are only interested in the question whether hats or onions are in big box D.R. or in big box I.R. My natural, and not unscientific, wish was to learn about the big boxes first. When I know that my Botany tops are in I.R. it will be time enough to examine further. Professor Pigou will find a reference to tops which shows that I was not entirely blind to the subdivisions of the big boxes, though I know well enough that he and not I should be entrusted with the labelling of some of the little ones. He has shown, that had I "realised what the issue really was," I could have made this part of my argument much stronger. I always thought I could.

I accept the rebuke, whose point is sharpened by references to ready-made clothes and "a certain *naïveté*." My statements in the section criticised were exceedingly incomplete. I was not writing a treatise. I was merely anxious to indicate that we have had hitherto, even from the very greatest economists, rather sketchy indications of the probable uses of the big and little cases, when filled. I was not anxious to suggest that it is Professor Pigou's business to teach a brewer to brew; but I think it may be his business, when he says that such and such social consequences will result from a tax on, or a monopoly in, commodities of such and such a type, to be able to tell the brewer whether in this context "commodity" covers beer as well as hats, onions and gold watches.

Professor Pigou does not say whether or not inventions are to be included in that general progress in the efficiency of an industry which tends towards increasing returns. I assume, therefore, that he agrees with me that exclusion will condemn the boxes to perpetual emptiness. His suggestions towards filling the boxes are much scantier than I had thought possible. I made my treatment a trifle crude partly in the hope of provoking someone to say—Give me these and those facts and series of statistics about, say, pig-iron and I will box it for you. I had anticipated that the facts and statistics demanded might be, by common consent, at present unprocurable; but I had hoped that they might be specified. And now I am paid with a cheque drawn on the bank of an unborn Jevons. Can no one give us more current coin? I do not deny that a second Jevons may do this thing; but I do not think that Professor Pigou's reply has given him much help.

Finally, I do not agree that discussions about method are " time wasted in quarrelling," even if, as Professor Pigou suggests, we may have an imperfect understanding of one another's methods. Public discussion elucidates the methods and improves the understanding. There has for some years been too much abstention from it among economists, due in part to a certain very natural piety. Things are constantly said in conversation which never get into print, and we need, as one of us would say, to bring inside and outside opinion into line. Mounted on the smoothly running machine which he handles with such incomparable skill, Professor Pigou may be a trifle impatient of suggestions that a rather differently constructed model might have a longer and more useful life; but that is no reason why the suggestion should not be made, even by a much less expert driver.

J. H. CLAPHAM