the monstrous doctrine that the ideally just arrangement is that which results when a single employer, or a small knot of employers, deals with a crowd of uncombined workmen competing against each other.

On the other hand the Trade Unionists have much to learn from the example of past failures, and from the precepts of their soberest leaders; we allude to Applegarth and his associates, in particular T. J. Dunning, whom our authors agree with Mill in esteeming. (*Cp.* Mill, *Political Economy*, Book V. § 5.) From the references given in the notes, if not from the text, may be obtained warnings against the danger of the extreme position that the whole produce of industry belongs of right to those who have contributed to its production muscular exertion.

Thus some advance is made towards the solution of the most difficult problem in practical economics, the determination of the just mean between the extreme limits to which labour on the one hand, or brain power with capital on the other, would if exercising the full power of monopoly push the other party. On this momentous question we may expect additional light in our authors' next volume, which will deal with the Problems of Trade Unionism.

Natural Value. By PROFESSOR FRIEDRICH VON WIESER. Edited with a preface and analysis by WILLIAM SMART, M.A., LL.D. The translation by CHRISTIAN A. MALLOCH. (London : Macmillan & Co. 1893.)

IN this volume Dr. Smart, assisted by Mrs. Malloch, continues the important work, which has already been greeted with applause in this Journal,[1] of presenting the doctrines of the Austrian school in an English version. Mrs. Malloch by an easy and elegant translation saves the English reader from the trouble of penetrating the original German. Dr. Smart saves him from the trouble of perusing even the translation. For there is hardly any important point in the book which is not adequately set forth in the editor's preface.

First comes the theory of marginal utility; a valuable exposition but of which the value, as measured by marginal utility, is somewhat diminished—to turn the theory against its own followers—by the abundance of expositions already in existence;

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[1] See Review of Professor Böhm-Bawerk's *Positive Theory*, translated by Dr. Smart. (Above, p. 22.)

many of them, it should be gratefully remembered, emanating from the Austrian school. We do not complain of having too much of a good thing; but we regret that it should be made the enemy of a better, or at least an equally good thing; that the principle of marginal utility should be so affirmed by the Austrians as to deny the principle of cost. Dr. Smart, as usual, puts the matter in a nutshell :—

" Just as the value of a stock is determined by its dividends, so do all elements of production get their value from the value they help to produce—an illustration which will be found very helpful generally."

Very helpful indeed, as it places us at the exact point where the Austrians diverge from, or lag behind, those who walk in the way of Ricardo. The former have not advanced far beyond that first stage which consists, in Professor Marshall's words, of " those temporary equilibria of demand and supply in which the cost of producing the commodity exerts either no influence or merely an indirect influence." [1] The disciple of the Austrian school so far as he is consistent, contemplates only the market value of stock; he does not carry his mind to the motives which led to the creation of that stock. According to him a mineral spring which " gets its value from the fact that its water is found adapted to certain wants of humanity " (Preface, p. xix) differs from " the case of production goods in general " only in a respect which may appear to the opposite school quite unessential, viz. " that the mineral water is the one and only product of the spring, while such production goods as coal, iron, unskilled labour are as it were wells of many waters." The Austrian school invoke the authority of Jevons; but they have not realised his conception that economic equilibrium depends upon (inter alia) the amount of effort and sacrifice considered as an independent variable.[2] It is not open to them to consider the worker—personally or through the vicarious action of parental providence—adjusting his occupation so as to obtain a minimum of toil, or a maximum of net advantages.

That is, we mean, the legitimate implication of the theory. For of course no dogma is held so strictly by a man of sense and ability but that he will deviate into correct statements of fact. Accordingly we shall find in some passages of Professor Wieser's work a grudging acknowledgment of the truths to which we have adverted.

[1] *Principles of Economics*, Book V. ch. ii.

[2] *Theory*, ch. v., referred to by the present writer in the review of Dr. Smart's " Introduction to the Theory of Value." (Above, p. 32.)

" The circumstance that expenditure of labour is felt to be a burden must somewhat affect the selection of employments to which it is devoted. It may occur as Sax has forcibly shown that a less useful employment of labour is chosen before a more useful one because the latter requires comparatively a greater amount of exertion " (p. 198).

But after all, as all science implies abstraction, it is no particular objection to a writer that he should confine himself to a single aspect of the subject. Why should not an economist treat only of market value, just as an historian—or at least an historical novelist [1]—might regard war as altogether an affair of battles, abstracting the directing genius and plan of the campaign which massed the contending troops upon the battle-field ? We do not think worse of the epic poet because he does not " date the Trojan war from Leda's eggs " [gemino ab ovo].

It is hardly a matter of reproach then to the author that he should demarcate a narrow field; especially as it is one particularly amenable to abstract reasoning. But it may be complained that he has obscured the one subject in Political Economy which admits of exact scientific treatment by his mysterious doctrine of " imputation." This is " a principle which will divide up the return and impute it to its factors." [2] In Dr. Smart's words :—

" Suppose a man's life were to depend on his last shot. The value of rifle and cartridge together is clear enough; but there is no means of ascertaining the value of each. Here are two unknown quantities and but one equation :—$x + y = 100$. How does this differ from the value turned out by the co-operating factors in any organised production ? In this, that each factor enters into multitudes of different combinations with returns of different values. There are multitudes of equations between production goods and values of return, and every production good can be traced as it enters into other equations. For instance, if labour works with various materials, and the return in each case has a different value, it is possible from the number of equations to come to a quite accurate understanding of what is due to each separately. If $x + y = 100$, and $2x + 3z = 290$, and $4y + 5z = 590$, $x = 40$, $y = 60, z = 70$." (Editor's Preface, p. xiv; cp. Book III. ch. v.)

Compare the author himself :—

" Every productive factor, if it is to be effective, must be combined with others and join its action with theirs; but the

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[1] Cp. Tolstoi's account of the battle of Borodino.
[2] Table of Contents referring to Book III.

elements that are bound up with it may alter, and this fact makes it possible for us to distinguish the specific effect of each single element, just as though it alone were active.

" It is possible not only to separate these effects approximately, but to put them into exact figures, so soon as we collect and measure all the important circumstances of the matter; such as the amount of the products, their value, and the amount of the means of production at the time. If we take these circumstances accurately into account, we obtain a number of equations, and we are in a position to make a reliable calculation of what each single instrument of production does. To put in the shortest typical formula the full range of expressions which offer themselves we have, for instance, instead of the one equation $x + y = 100$, the following :—

$$x + y = 100.$$
$$2x + 3z = 290.$$
$$4y + 5z = 590.$$

Here $x = 40, y = 60, z = 70$."

This theory appears to us to present some difficulties and no advantages. We may distinguish (a) the singular case of individual producers, (b) the ordinary case of production in a regime of competition.

(a) In the first case it seems difficult to attach any definite meaning to the " imputed " share. Let us modify the author's example of the hunter by supposing that rifle and cartridge procure, not the hunter's life, but some more finite good reckoned as 100. So far " all that can be said as to their value lies in equation $x + y = 100$." Now suppose that with a rifle and *two* cartridges the hunter can bring down more game, but not twice as much—the game being startled by a first shot. There would be obtained then, if we rightly understand the doctrine, a second equation of the form $x + 2y = 180$. Subtracting the second equation from the first we have $y = 80$. Thus a value of 20 is " imputed " to the rifle and to the cartridge 80. Can it be seriously maintained that this conception is appropriate; that this proposition has any correspondence with economic or psychologic experience? What is the signification of the equations in a case which might well arise of two cartridges with a rifle being worth more than twice one cartridge with a rifle; say owing to the advantage of securing wounded game by a second shot? In such a case we might have $x + 2y = 250$ for our second equation. Whence $y = 150, x = -50$. The rifle is worse than valueless !

(b) In case of a regime of competition an intelligible meaning may be assigned to the share of a factor in contribution, namely the normal value of the last increment of the factor; which is theoretically equal to the amount of product due to the increment.[1] It is doubtful whether Professor Wieser aims at this object; it is certain that he does not hit it fair.

We have upon this view a problem of the sort which has been treated mathematically by Professor Marshall, Professor Walras and others. The case would seem to be that of a " Joint demand " for the articles x, y, z, to be used in various proportions in the production of three articles which might be called u, v, w. For simplicity we may suppose the supplies of x, y, z respectively and the demands for u, v, w respectively not to be " Joint." In order to determine the value and amount of each productive factor, the proportion thereof employed in each industry, and the value and amount of each product, we have then just as many equations as there are unknown quantities.[2] These equations

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[1] Cp. Marshall on the " Marginal Shepherd," Principles, p. 567. The amount of product added by the addition, or subtracted by the subtraction, of the increment. The two, or rather three, attributes united by this definition become separate when we consider, instead of increments, finite large amounts of a factor of production. In the latter case we may adopt any one of the attributes as the definition of the share attributable to the factor—query if with much advantage. Compare note on p. 243.

[2] For a statement and formulation of the conditions of economic equilibrium see Professor Marshall, Principles of Economics, especially Book V. and Mathematical Appendix, notes, 14—21; also Professor Walras, Éléments d'Économie Politique pure. The following adumbration of the general idea may assist our readers.

Let us confine ourselves to two commodities u and v : into which enter two factors of production x and y; into u, $x_1 y_1$, into v, x_2 and y_2. Let π_1, π_2 be the prices of x and y respectively, p_1 and p_2, of u and v respectively. We have for the ten unknown quantities $x_1 x_2$, $y_1 y_2$, u, v, π_1, π_2, p_1, p_2 the following ten equations :—

(1) $x_1 + x_2 = \phi_1 (\pi_1)$, where $x_1 + x_2$ is the amount of x supplied at the price π_1.

(2) $y_1 + y_2 = \phi_2 (\pi_2)$, where $y_1 + y_2$ is the amount of y supplied at the price π_2.

(3) $u = f_1 (x_1, y_1)$, where $f_1 (x_1 y_1)$ denotes the amount of the product resulting from the employment of the factors x_1 and y_1.

(4) $v = f_2 (x_2 y_2)$, with a like interpretation.

(5) $u = F_1 (p_1)$, where u is the amount of the first commodity demanded at the price p_1.

(6) $v = F_2 (p_2)$, with a like interpretation.

(7) $dx_1 \dfrac{df_1(x_1 y_1)}{dx_1} p_1 = dx_1 \pi_1$; since the application of x_1 will be pushed up to the point where the additional gain is just balanced by the additional cost. For a like reason,

(8) $\dfrac{df_1 (x_1 y_1)}{dy_1} p_2 = \pi_2$.

(9) $\dfrac{df_2 (x_2, y_2)}{dx_2} p_1 = \pi_1$.

(10) $\dfrac{df_2 (x_2 y_2)}{dy_2} p_2 = \pi_2$.

may be compared to those of mathematical physics in that from known conditions they afford inferences concerning unknown quantities. For instance, if the supply of one of the factors, x, increase, it may be presumed that the value of the other, y, will increase [1] more or less according to the expansibility or elasticity [2] of the demand for the products u and v, the extent to which the production of each article is increased by an increase of either of the factors employed, and the elasticity of the supply.[3] Professor Wieser makes some very simple inferences of this sort; [4] but, it is submitted, by the light of common sense, not in virtue of his peculiar doctrine of " imputation."

Professor Wieser's equations [5] are not comprised in ours; but they are deducible therefrom or from the same fundamental conditions. But how ineffectual the proposed system is may be understood from the fact that the author seems to think the problem indeterminate if the number of equations each furnished by a combination of production factors be not at least equal to that of the commodities.[6] Whereas, according to the genuine

[1] Assuming a certain simplicity in the form of the functions with which we are concerned.

[2] The term employed by Professor Marshall.

[3] The character of the functions F_1 and F_2, f_1 and f_2, ϕ_1 and ϕ_2.

[4] E.g., *Natural Value*, p. 103.

[5] I suppose Professor Wieser's equations to be in my notation (in the case of two variables, *e.g.*),

$$(a)\quad \Delta x_1 \frac{df_1}{dx_1}\pi_1 + \Delta y_1 \frac{df_1}{dy_1}\pi_2 = \Delta u\, p_1,$$

$$(b)\quad \Delta x_2 \frac{df_2}{dx_1} + \Delta y_2 \frac{df_2}{dy_2}\pi_2 = \Delta v\, p_2.$$

There must be assumed, I think—what is not in general a necessary assumption —that Δx_1 and Δy_1 have a fixed relation between them. Say they are equal small units; then our $\Delta x\pi_1$ would correspond to Professor Wieser's x, our $\Delta y\pi_2$ to his y; and if (in a particular case) $\frac{df_1}{dx_1} = 1 = \frac{df_1}{dy_1}$, equation (a) will be identical with his equation $x + y = 100$; supposing that the application of a unit of x and a unit of y results in an amount of product of which the value is 100. We have thus in (a) one equation for determining the value of x and y. A second equation is afforded by (b).

This is, assuming that the author's x, y (and z) may be regarded as marginal increments; as Dr. Smart appears to intimate (Preface, p. xiv, last par.). It should be observed, however, that much of the author's reasoning presupposes considerable quantities as distinguished from increments. Thus the mighty distinction which he draws at Book III. chs. vi., vii. between the "share dependent on co-operation," as calculated in the case of a cart-horse, for instance, "by the diminution of return which would ensue were the farmer to lose the horse, and be forced to go on without it," and the " productive contribution " as calculated by his own equations, is not agreeable to the conceptions of the differential calculus.

[6] " It is because the productive elements enter into innumerable combinations, each with different values, that we get, by a method of equations, the contributions

mathematical method, the number of articles into which the factors enter in different combinations is a matter of indifference. The system would be equally determinate if there were only *two* combinations with three factors of production.[1] How little the proposed method follows the analogy of natural philosophy may be understood from the fact that the number of the unknowns may well be exceeded by the number of the equations; as the author seems to admit without surprise, p. 90.[2] We miss what Professor Marshall calls " the chief use of pure mathematics "— " to make sure that he [a person] has enough and only enough premises for his conclusions (*i.e.*, that his equations are neither more nor less in number than his unknowns)." [3]

Altogether the proposed equations seem to be of little assistance in the main problem of economics, the determination of the equilibrium of demand and supply. The genuinely mathematical method might be compared to a theory of the tides which from conditions relating to the causes thereof enables us, by a determinate system of equations, to predict more or less accurately the height of the tide at given hours. The quasi-mathematical Austrian method may be compared to a set of equations connecting the unknown quantities with certain empirical data; for example the heights of the tide at two assigned times with the difference between the volumes of water at the two times in each of two rock basins whose shape is known. The number of such " observation-equations," as they may be called, might far exceed the number of the unknowns; and it is conceivable that the reduction of such observations might afford the handiest method of measuring the required heights. But it would be very odd to regard such equations as a substitute for the theory of the tides.

It may be doubted indeed whether the indirect mode of observation would ever be resorted to; or, dropping the metaphor, whether the producer would ever resort to the Wieserian equations to determine the share attributable to the productive factors or portions thereof. It should not be concealed however that the

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imputed to each." Table of Contents, referring to Part I. ch. v. *Cp.* p. 86 and p. 94, 3rd par.

[1] P. 90.

[2] In the case discussed in last note where there were only two articles, let one, say v, fall out; and with it x_2 and y_2 and p_2. There will remain only six unknown quantities for which there remain six equations, viz. (1), (2), (3), (5), (7), (8). The system is still determinate.

[3] *Principles of Economics*, Preface to first edition, p. xv.

analysis commends itself to Dr. Smart's " practical experience."
We refer to one of the most instructive passages in the volume
(Preface, p. xiv.) in which Dr. Smart records his experience, that
of an old entrepreneur, in the matter of " osting."

Differing thus fundamentally from Professor Wieser's cardinal
principle we could not usefully act as the interpreters of the
propositions which he connects with it. It must be left to others
to discuss the " natural value " of capital and labour; and to
decide how much truth is contained in the following passage :—

" Monopoly goods have often received a quite peculiar position
in theory. Ricardo, for example, teaches that they owe their
value altogether to their scarcity, while all other goods receive
their value from the labour of producing them. A sufficiently
wide consideration, however, shows that monopoly goods come
altogether under the ordinary conditions of valuation, and differ
from other economic goods only in that they display more strikingly
the character common to all."

Nor will it be attempted here to examine the argument that
" a general rent . . . where all qualities of lands and all powers
of the land, even those of the lowest class, are required to meet the
demand " . . . must enter into costs [1]—or to estimate what
weight is added by Professor Wieser to a balance in one scale of
which is the authority of J. S. Mill [2] and in the other scale that of
Professor Marshall.[3]

It remains only to notice the topic from which the book
derives its name. Here is the author's definition :—

" The value which arises from the social relation between
amount of goods and utility, or value as it would exist in the
communist state, we shall henceforth call ' Natural Value.' "

An important principle is no doubt suggested in this passage
and the following and their contexts : [4]

" It would be impossible to obtain a more exact and distinct
measure for the thousandfold variety of economic satisfactions
than that afforded under the necessary conditions by the marginal
value of goods." [5]

In fact Professor Wieser's vague idea of somehow employing

[1] *Natural Value*, Book, V. ch. xii.

[2] *Political Economy*, Book III. ch. v. § 2, par. 3 : " It [Rent] might do so
[form part of the cost of production], and very largely too." *Cp.* Book III. ch. ii.
§ 2, par. 1 : " On countries fully occupied and cultivated."

[3] " On Rent," ECONOMIC JOURNAL, March 1893, and passages in the *Principles
of Economics* there referred to.

[4] *Natural Value*, Book II. ch. vi.; Book VI. ch. iii.

[5] Compare the author's statement in the first volume of the ECONOMIC
JOURNAL, p. 120.

the economic conception of utility so as to assist an administration aiming at the good of the community appears to be partially realised by the principle of *Consumers' Rent.*

Women's Wages. By WILLIAM SMART. (From the Proceedings of the Philosophical Society of Glasgow), 1893.

MR. SMART makes some contributions to the solution of the difficult question : " Why is women's wage less than that of a man ? " Enumerating several commonly alleged reasons, he observes that each of them " is at best a half truth "; taken singly, it does not account for all the phenomena. Thus, the fact that women are not the sole breadwinners of the family is often confidently stated as a sufficient answer to the question; as if, forsooth, in an open market two similar commodities, two equally efficient agents of production, may be expected to sell at different prices.

" To the purchaser it is indifferent whether the cloth he buys wore out the fingers and heart of a woman, or only took a little tear and wear out of a machine. The one question he asks is : How will the cloth wear ? *Caveat venditor.* If a man-worker, then, is supposed to get a high wage when he produces much, a low wage when he produces little, why should a woman's wage be determined by another principle ? "

The labour-market is not free, it is clogged by custom. The action of custom is thus illustrated by Mr. Smart from a trade with which he is specially acquainted :—

" In the cotton thread trade, spooling—that is, winding the thread on the small bobbin familiar to every workbasket—was for many years done by women sitting at single machines not unlike sewing machines, filling one spool at a time. The customary wage was sixpence per gross of 200-yard spools; a good worker could spool at least four gross per day, and make twelve shillings a week. As in all industries, machinery was gradually intro- duced by which cunning arrangements of mechanism did the greater part of the work; instead of turning out one spool at a time the girl now watched the machine turning out six, or nine, or twelve spools. When these machines were introduced, how were the wages determined ? For a few weeks the girls were put on day wages, and when the machines were in good working order, and the average production per machine had been ascertained, the piece-work rate was fixed so as to allow of the