ABSTRACTIONS, THINGS, WEALTH, AND DEINDUSTRIALISATION

Introduction

The specific topic of this paper is deindustrialisation.

The underlying and main theme, however, is that the logically correct standpoint from which to view the development of industry and services, indeed the development of society and civilisation, is that things have primary status. All else is secondary. By "logically correct", I do not wish to convey a merely pedantic point. I mean that a prescription for action which proceeds from an assumption that things do not have primary status (for example that non-things ranging from philosophies to "services" are of logically equal status) will be ill-founded, since based on a misperception. By "having primary status", I do not mean "more important" or "more estimable". I mean by "primary" the basic dictionary notion of being first. Things are first, the rest follows. By "things", I mean all tangible final products. In particular, I include in this, on an equal footing, agricultural as well as industrial goods. Whatever may be the case in the disciplines of political and social history, in economics it has been a misfortune that we have all been brought up to regard agriculture and industry as being in two distinct logical categories. The very name "industrial revolution" obscures the reality that agriculture and industry have co-existed from the beginning (it might even be said that industry in the form of shelter-construction and tool- and weapon-making pre-dates agriculture) and took part together in the marked technological advance which is called, misleadingly, "the industrial revolution".

Wealth is primarily things

Wealth, from this standpoint, is nothing but all physical manufactured, constructed, agricultural and naturally provided (including mined, hunted or collected) goods, plus the knowledge and skills necessary to generate them. "Goods" here means final goods. To include the machines, fuel and buildings which are involved in making these goods, is in some sense to double-count. To include, farther, non-tangible satisfactions such as musical or theatrical performances is to proceed towards treble-counting.

Suppose we wanted to compare the current well-being of the inhabitants of Dallas and Glasgow. How would this be done?One way is to look up the official statistics compiled from surveys of annual sales, incomes and prices, covering all final, intermediate, and capital goods, *and* services of all kinds, these latter forming the predominant portion - that is, all money-mediated transactions in a year. Essentially, these numbers are total money income or expenditure, "deflated" by some honest but in the end arbitrary arithmetic about relative prices. At the root of this procedure is the notion that any tangibles or non-tangibles involved in a transactions can be aggregated at "real" or deflated price, and in particular that a thing and a service are equivalent if they have the same price.

An alternative is to go and look. This is what tourists and travel-writers do, and their impressions are rarely greatly at variance with the income- and sales-based statistics. This method does not rely at all on the availability of people, or a study of their incomes or spending habits. It could be done even if on the day of inspection every single inhabitant was absent. It would rely simply on the enumeration, and quality assessment, of physical goods. Easily the main one would be housing, or say the number of square feet of housing per inhabitant. Next, the things in and around the house; how many cars, and how big; what equipment in the way of fridges, telephones, videos, fax machines, computers; how much furnishing, of what newness and quality; ditto for clothes; how many books, how many newspaper pages; what sports equipment; how much land, how many garden plants and trees. This already goes a long way to the answer, and covers the way in which we make guesses at the well-being of our acquaintances or neighbours. However, the survey would be deficient if it did not cover the number, width, condition and accessibility of the streets, the convenience and opulence of the shops, including food shops; the number and *visible* standard and contents of the empty restaurants, theatres, libraries, schools, museums, clinics and hospitals. We would then try to observe the wider infrastructure of physical objects, such as the road and rail system, the hotels and swimming pools, the airports and airliners, the banks, the defence installations and equipment; and, lastly, the industrial offices, buildings and equipment. The reason these are listed "lastly" is that they exist only to produce the items already enumerated, and thus constitute a sort of double inventory. Suppose now that you went to Dallas, and found only rudimentary huts and cooking utensils, but, when the inhabitants appeared, it turned out that they were philosophers. You would be able to conclude that this was uplifting, but there was no wealth there. Also you would suspect that there must be a slave encampment nearby.

Progress is synonymous with growth of productivity

If the matter is looked at from a historical perspective, it can be seen that we have reached the present situation of prosperity due to the fact that the human animal is inventive in dealing with things, including in this, of course, not only manufactures (this is a modern perspective) but foodstuffs, and food- and draught-animals (from say seven millennia ago until quite recently, the emphasis was on agriculture, and the tools for agriculture). This inventiveness, which translates into the growth of productivity, ensures that as time passes, more and more is produced by fewer and fewer directly "productive" workers, leaving more and more time available for other and (often) higher activities. Those higher activities may be a sign of wealth, may even be referred to rhetorically by some as the "real" wealth of a civilised society, but logically they are subsidiary. First there are things, only secondarily or *consequently* culture. First there was agriculture, only secondarily Aristotle and Alexander the Great. The increasing production of things gives rise to, *creates*, both the servant and the master, the student and the teacher, the reader and the author, the audience and the performer, everyone who is fed, clothed, warmed and housed without himself hunting, tilling, weaving, mining or building. In the case of agriculture, this process is approaching its end point. If and when the world reaches American or UK standards of agricultural productivity, a negligible fraction of workers will produce more food per head than ever known in the history of the race.

For manufactures, the process is rapidly heading to the same conclusion. Much that is true, but deeply misleading, has been written about "de-industrialisation". Not the least misleading is the picture that industry has risen and is now falling, when the correct perception is that employment in the production of things, agriculture included, has been declining since time began. The fact is that the volume (not the money value) of manufacturing output in advanced and developing countries is ever growing, with the involvement of an ever decreasing percentage of the workforce. The time is not very far distant when a plethora of "things" will be produced by workforces reduced to single percentage figures.

This simple but paradoxical fact, that all logically real wealth, that is, all physical manufactured, constructed and agricultural goods, will be produced by a small and decreasing fraction of work people is, I believe, the main element which is missing in the prevalent perceptions about how wealth is created. The paradox lies in this: that a tiny fraction of the workforce means a tiny fraction of money GDP. We are already frequently reminded that manufacturing is only a quarter of GDP. It will fall further to negligible levels. The difficulty is to keep in mind that prosperity, that is, the aggregate GDP, depends, and will always depend, *entirely* on this seemingly "unimportant" sector.

Insofar as other sectors seem to grow in importance, this can happen only if "things" are provided, by which the efforts of people in those sectors can be amplified. It is extraordinary that people can speak of the "importance", even the "greater importance", of improving productivity in a service sector which is itself often described as being of "greater importance", when the difference in *service* productivity between an unequipped human body (e.g., a mere manservant) and a modern "service worker" is due *entirely* to the *things* used in the work of supplying services - the books, the blackboards, the chalk, the schools, the hospitals, the operating tables and equipment, the roads, the ships, the cables, the satellites, the transmitters, the theatres, the taxis, the hotels, the computers. Another way of putting this is that money GDP depends on current prices, and if "things", are relatively more subject to productivity gains, they are necessarily (indeed it is a tautology to re-express it thus) becoming relatively cheaper and cheaper. However, if output could be calculated in real volume terms, say in Adam Smith's 1776 prices, or even 1920 or 1950 prices, virtually all of GDP would be accounted for by the production of things.

De-industrialisation and economic abstractions

Is the above simply a statement of the obvious? Apparently it is not. For two or more decades, there was an extensive pessimistic literature on "de-industrialisation", which was perceived as a sort of disease (see Stanners, 1996a). Even the fact that industrial goods were predicted to become cheaper was presented as a "bleak picture" in terms of services becoming dearer (Baumol 1967).

Much comment on, say, unemployment, or welfare-dependency, or the pensions time-bomb, is in terms of the various abstractions which have produced Nobel prizes, but serve in practice as a intellectual fog preventing the commentator from seeing that what primarily matters are things, and the distribution of things. Thus books can be

written on one of the above "problems" without defining what it means, or why it is a problem. Indeed, little interest may be shown in the concrete realities of the chosen subject. As in journalism or politics, it may be assumed that the Jarrow march was occasioned by people's need for jobs, when in reality they primarily needed title to some food for themselves and their families, that is, an income. Theories are developed involving abstractions like demand, preferences, elasticities, market-clearing, sticky wages, trade union "inflexibilities", funding, time-horizons and money, but nowhere will it be noticed that things are being produced in ever increasing abundance in spite of the unemployment, the welfare-dependants, the prematurely retired and ageing. It will thus not be considered that the real *economic* problem may not be the socio-political one which in fact seems to motivate the discussion, but the unabstract one of distributing title to this ever-growing flow of things. Examples of this type of misperception can be found, at the time of writing, in nearly all Anglo-Saxon commentaries on the allegedly dismal performance of the (in fact quite decently growing) German economy. Its high unemployment rate is cited over and over again, much less often its better distribution of title to income to inactive citizens including the "unemployed".

A striking and incontrovertible example of this blindness in the face of patent facts is the question of inflation. No serious and convincing evidence has been found that inflation matters as far as economic growth rate is concerned (see Stanners, 1993, 1996b), and yet it suits politicians, and presumably the electorates whose votes they seek, to insist stridently that low inflation is necessary for growth. There has been extreme reluctance to give any clear and direct message contradicting this. On the contrary, essentially trifling and untested but politically congenial theories involving shoe leather and menu prices have been provided and taught in classes, and econometric work has been published in which the required conclusion is given, but does not follow from the algebra (see Stanners, 1996b, and, for an example, Alexander 1997, cited in Stanners, 1998). The main descriptive references to the Weimar and other catastrophic inflations (Bresciani-Turroni, 1937, Cagan, 1956) do not acknowledge clearly (although they give the evidence) that output was relatively unaffected (Barro, 1993, p201). Barro, to whom I am indebted for this information, but who has himself contributed elsewhere to the "low inflation is essential" myth (Stanners, 1996b), devotes 14 words to this extraordinary fact.

In a similar way, studies of de-industrialisation, while seeing the bare fact of growing industrial production (in peripheral vision, as it were), have *tended* to adopt a pessimistic and doom laden tone, as if the abstractions (in this case the media- and politics-driven perceptions as well as the usual ones of preferences, demand, etc.) made it difficult or impossible to see or acknowledge the plain fact of industrial plenty. Thus the sociologist Bell (1973) invented the totally inappropriate term "post-industrial". Baumol (1967), while referring clearly to all the real factors involved in growing productivity, concluded oddly (p 426) that "the picture which has been painted is bleak". He had noted before (p 419) that "the growth rate of the economy will asymptotically approach zero", and that the cost of services "will rise cumulatively ... without limit ... relentlessly ... beyond the control of those involved". Skolka (1976) also concluded from his algebra (p 284) that, "Due to differences in labour productivity growth, labour is gradually transferred from the 'productive' sector A to the 'non-productive' sector B, so that after a certain time, sector A ceases to exist

and the nonproductive sector B expands over the whole economy, which will consequently stop growing." Broadberry (1992) stated (in the "Non-technical summary") that "the reduction of employment in low productivity agriculture is important in explaining the extent to which Germany caught up" post-war, when the merest acquaintance with real agriculture as seen from a car window shows that productivity growth in that sector is far from low (and German statistics confirm that it was around 5% per year). Later (p 11), he cites other authors (one of whom is Kaldor) as supporting the idea that "the shift out of agriculture ... was a very important part of the catching-up process", when in fact this shift, being a tautology for productivity growth, *is* the catching up process. The introduction to Rowthorn and Wells (1987), describing British de-industrialisation, uses phrases like, “parlous condition ... crisis looming up ... dramatic collapse ... rapid increase in unemployment ... acceleration in the tempo of industrial decline ... searing experience ... inexorable rise in unemployment ... thoroughly unsatisfactory performance ... enterprises failed to perform satisfactorily ...”. The correct view of deindustrialisation is clearly stated in a few words (p5), under the title of "positive de-industrialisation", but throughout the book it is used only to emphasise that British de-industrialisation was not of this kind.

By the late 80s, Baumol *et al.* (1988) had, as they frankly acknowledge, caught the mood of reviving self-confidence in the United States, and in a re-working of the1967 formulation, they now draw the conclusion (p 140) that, contrary to the doom-sayers, there is no danger of the US becoming a "service economy", since in real terms, industrial output is maintained, in spite of declining employment in the sector. Rowthorn too has adjusted his view (Rowthorn and Ramaswamy, 1997). The Thatcher recession, and the understandable academic disapproval of it which gave rise to the 1987 book, had given place to the normal recovery. The new paper now "argues that, contrary to popular perceptions, deindustrialization is not a negative phenomenon, but is the natural consequence of the industrial dynamism in an already developed economy". This formulation accords closely, in fact, with the few words on "positive deindustrialisation" already referred to in the earlier book, but it is no longer a throwaway line against which to contrast at great length the British (alleged) reality of "negative deindustrialisation" - it is the main message.

Features of the deindustrialisation "models"

It might appear from the above that everybody has now converged on agreement on the nature of deindustrialisation. But this is not so, and will not be so as long as prominence is given to the abstractions which provide material for theories, papers, course syllabuses, examination questions, books, careers, and Nobel prizes, but which divert attention from reality. Evidence for this is provided by even the latest stages of the above history.

When Baumol said in 1967 (p 419) that "the growth rate of the economy will asymptotically approach zero", he did not stress, i.e., take the necessary pains to warn the reader, that this conclusion had been built into his algebraic development by the arbitrary assumptions, a) that the two sectors maintained equal shares of output throughout, and b) that the productivity of the service sector was fixed, i.e., had zero

growth rate. The algebra then showed that if one started at "the present" with an dynamic industrial sector with constant productivity growth rate, employment would be constantly transferred from the industrial to the service sector, until at last *almost* the entire economy was represented by this sector. And since its productivity was fixed, the economy would cease to grow, even if the industrial sector was still (with labour force ever tending towards, but never reaching, zero) producing its original share of output. Baumol had introduced his constraint a) with the words (p 418), "We may inquire ... what would happen if the relative outputs of the two sectors were maintained", but in the conclusion this tentativeness is not recalled. If he had wished to convey that the conclusion flowed from nothing but a tentatively interesting model, he would hardly have said, "the picture which has been painted is bleak". Although the bleakness flowed only from an undefended assumption, applied via a simple algebraic apparatus incapable of mirroring the complex reality, he wrote as if the result applied to the real world. One can only presume that economic theory is so rarely confronted with fact that the prior assumptions, the theory, the conclusion, the paper, constituted the desired end result. Baumol's main (and correct) concern was that constantly rising relative prices for service sector goods entailed some uncomfortable consequences, including higher taxes. But when this picture is merely a mirror-reflection of the constantly falling relative prices for industrial and agricultural goods, a process which has been going on since the beginning of time, resulting in us all having knives and forks and clean shirt every day, instead of only the few rich, it is difficult to see why the overall prospect should be "bleak".

Skolka is a rather different case. He too assumed constant fraction of output for each of two sectors, and zero growth of productivity for the service sector. But instead of assuming constant growth of productivity in the industrial sector, he imposed a constraint of constant growth rate on the entire economy, as well as on each of the two sectors. This meant that the service sector grew exponentially at this rate only through the growth of its labour force, while the productivity of the industrial sector had to grow faster than exponentially in order to keep that sector growing at the same rate in spite of its rapidly attenuating work force. Skolka sets down (p 282, eqn 4b) the algebraic expression for the precise instant when this runaway train hits the buffers at top and accelerating speed, i.e., when the industrial labour force, producing at furious tempo only a moment before, suddenly becomes identically zero. This gives rise to his statement, quoted above, that "the whole economy .. will consequently stop growing". He does not remark that the plain result of his algebra is that this society would not only "stop growing", it would be instantly transported back to the Stone Age. Clearly, neither Skolka nor his presumed readership are concerned about real things.

The algebra of Rowthorn and Wells, and of Rowthorn and Ramaswamy, is essentially the same as that of Baumol. It introduces a third sector for agriculture, but since it is small and vanishing, and its productivity growth rate is set equal to that of the industrial sector, the two sectors are effectively one sector, which I shall call the "primary" sector, corresponding to Baumol's and Skolka's dynamic sector, and, to the "primary sector" in Stanners (1996a).

It might be helpful to the more-than-casual reader at this point to summarise, in parenthesis, information which it is not totally obvious on reading these papers, namely what precisely are the constraints assumed. They are as follows:

Sector	Growth rates of	Baumol/ Rowthorn	Skolka	Stanners
Primary	output	fixed	fixed	FLOAT
	productivity	fixed	FLOAT	fixed
Secondary	output	fixed	fixed	FLOAT
	productivity	fixed	fixed	fixed
Total	output	FLOAT	fixed	fixed

The main differences in outcome is that Skolka's world ends with a bang, the others all result in primary sector employment tailing off to zero at infinite time. Baumol and Stanners differ only in that Baumol has the growth of the total economy (*and* that of the primary sector) converging on the productivity growth rate of the secondary sector, while in Stanners, the growth rate of the total economy is fixed at an intermediate value. (In my view, this is more realistic in that it avoids any highly unlikely "end of history" effect, but the difference is not fundamentally important.)

The main result of Rowthorn and Ramaswamy

Rowthorn and Ramaswamy, then, making the Baumol/Skolka assumption of constant fraction of output for each sector, arrive at Baumol's conclusion, namely eventual growth of the whole economy at what I will now call the "secondary" sector's productivity growth rate, here assumed to be non-zero. These authors also adopt (p 21) Baumol's non-neutral name for this state - "asymptotic stagnancy".

Rowthorn and Ramaswamy do not specifically remind the reader that assuming a constant fraction of output for both sectors implies not only that the whole economy's growth rate converges down to that of the secondary sector, but also that the primary sector maintains for ever, in real terms, its time-zero fraction of output. I quote the text at the relevant point (p 21). "If manufacturing is 'technologically progressive', and services 'technologically stagnant', then the economy as a whole is 'asymptotically stagnant' - i.e., the growth rate over the long run will be determined to a large extent by the growth of productivity in the services sector ... The theory of 'asymptotic stagnancy' ... essentially implies that contrary to popular perceptions, productivity growth in manufacturing is likely to be less important than it used to be for increasing the overall growth of productivity and living standards in advanced economies. As the process of deindustrialization continues, the overall growth of the economy will increasingly depend upon productivity improvements in the service sector." Clearly this is simply not so. The inappropriate image of "stagnancy" has been given priority over the result of the paper's own algebra. If the real outputs of the primary and secondary sectors always stand, by the authors' own definition, in the same relation to

each other, then obviously the overall growth rate of the real economy will depend upon productivity improvements in either of the two sectors, just as it always did.

The above result, asserting the greater importance of productivity improvements in the service sector, figures in more or less the same words in the "Summary" of the paper, and in the last section headed "Conclusions". There is thus no doubt that it is considered by the authors to be a main conclusion. If the prescription for action implicit in this conclusion were to be followed, it would obviously be harmful.

The fact, just demonstrated, that the conclusion does not follow from the algebra is almost the least of its weaknesses. Let us look more closely at the algebra. Suppose the assumption of constant sectoral fraction of real output had any fundamental validity (the paper gives data to show that it is roughly true over three decades or so). If we write down the same algebra for more than 2 sectors, for indeed a large number of sectors as in the real economy, one sector can always be found which has zero productivity growth, just as Baumol assumed in 1967. The same mechanism would operate, with labour being continuously moved in cascade from sectors with higher to sectors with lower productivity growth rate, eventually arriving at the first Baumol result of zero eventual growth. The question would then arise: How could the economy get to a diverse starting point in the first place? Surely the model implies that growth is impossible, and further, that a diverse economy is impossible. Clearly this is not so, which means that it is not realistic to posit fixed output shares for sectors defined by productivity growth rate. The real world is simply too various for that to be credible into the far future. Thus the algebra itself, even if understood properly, is not a reliable vehicle for making any predictions at all about this future, apart from the safe qualitative prediction that the production of things will take up less and less of the labour force.

The weakness goes much further still. This main conclusion of the paper is not only a faulty deduction from unconvincing algebra, it is in fact *without meaning*. Or rather, whatever meaning it has attenuates the farther one goes into the future, or for that matter the past. The reason goes to the heart of economic theory, and is one of several reasons why the subject can never be a branch of science. It is that all the abstract terms involved - "productivity", "growth", "important", "living standards" - are incapable of satisfactory definition, incapable of being reliably ranked, let alone measured. A serviceable pretence for practical use can be maintained over a short period, and among government statisticians who have a clear understanding of each other. But essentially, people professionally engaged in adding apples and pears - a violation of the most basic scientific rule - can never succeed. They must always be engaged in a necessary and useful pretence that mere *ad hoc* recipes, always in need of patching up, can be called measurement, and are thus logically in the same category as procedures for measuring weight or length.

Productivity, for example, is a ratio for which neither the numerator nor the denominator can be defined in a non-arbitrary way, and that is true for a single well-defined product-item (say, a pair of scissors) subject to normal incremental production improvements, even more for ill-defined goods (such as a car, or at the extreme, a computer), and more still for a sector comprising many different goods (the industrial sector). The definition of growth involves time, over which nothing

will remain unchanged. Of living standards, hardly anything objective can be said. In my sketch above on the tourist's evaluation of living standards in Dallas and Glasgow, the picture was drawn of the sort of intuitive aggregation and evaluation that we can all do in surveying a plethora of different objects. An office-full of statisticians might work for a year without producing an objectively better result. If one sample has more housing area and more and bigger cars than another, the result insofar as cars and houses are concerned is fairly clear, but if one lot have bigger houses but fewer cars how do you aggregate? The statisticians of course evolve *modi operandi* and the statisticians of different governments meet to harmonise their methods, but the work is essentially *trompe l'oeil*. The point that is being made, laboured perhaps, is that if we are talking of a time when industrial employment is tending to zero, but things are pouring forth, produced perhaps by thousands of robots in charge of a few men, then talk about living standards, let alone what will be "important" for improving living standards, is quite futile. The correct perception is that "things are pouring forth". Subject to constraints put in place by nature, and to the assumption that the human race can proceed without inadvertently annihilating itself, that is the only sure prediction, and the only one which matters.

Concluding remarks.

The algebra mentioned above is by no means advanced, perhaps final school level. The critical points made are obvious, or at least not at all obscure.

How can such relatively elementary errors of perception arise? Clearly it cannot be any deficiency in the authors, who are eminent in their field. Nor does the author of this paper claim any merit for pointing out the near-obvious. His role is more akin to that of the ignorant and innocent boy in Andersen's tale.

The only explanation that occurs to me is that the culture of economics is not primarily interested in things as such, but in ideas, abstractions. My touchstones are simply not those which are prevalent in economics. In science, the subject is things. Truth consists in the alignment of theory with observed things, and careers are made by discovering truth. In the humanities, there are views, opinions, ideas. Truth is nothing more than the avoidance of lies, and careers are made by achieving more esteemed views, opinions and ideas. (The economists Colander (1989) and Clower (1989) have expressed fairly similar viewpoints.)

Adam Smith, moral philosopher, was clearly in the second camp, but his successors have embarked on a course which has led them to clothe their humanist opinions in the language of science. Unlike science, however, the subject has no historical and logical layers of established foundation. The castle totters on a base of unstated assumptions. Expositions start *in medias res*, as if the terms used were elemental concepts. Samuelson (1947), without much preamble says (e.g., p43) in his Nobel Prize-winning work, in effect, "let D=demand", as if demand was something you could order a pint of. Then he says, in effect, "let's differentiate it with respect to price", as if that needed no justification, and without mentioning units such as "pints squared per year and $US", and without saying how one might observe a demand and

a price. Later Debreu too had a Nobel Prize, not for looking at the foundations, but for building the castle higher.

More mundane evidences of a habit of mind detached from the real world of things spring to mind. It is striking that science or engineering are rarely mentioned. They are largely "exogenous". One would imagine that money was what mattered. Even Adam Smith, although he famously discoursed on the division of labour as a main cause of progress, did not dwell on the power of water or coal, except insofar as they represent "capital", or in the case of water, a means of communication and transport. The only mention of water power that I can find is a remark that there were no water mills in northern Europe until the 15th century. Coal is a source of rent for the mine-owner, and a commodity for the trader, but its importance for motive power seemingly remains invisible. Smith, of course, devotes scores of fascinating pages to silver.

Even more mundane is this: in the normal real world, redundant digits in a number are shunned. No one would say "I rode my bike to town at an average speed of about 9.80952 miles per hour", this being the number resulting from a dividing 10.3 miles by 1hr 3min on a pocket calculator, nor would a scientist or engineer under any circumstances say a quantity was 9.80952 ± 0.03456. Why? Because these are real world situations, the numbers mean something to author and audience. It is not that the nonsense digits do any immediate harm, but they are felt to be absurd, like saying "nine point eight zero ga ga ga". They debase the language. In economics, there appears to be no such inhibition. I reach behind me and take a UK government publication from the shelf. It contains thousands of numbers, all given to 4, 5 or 6 digits. It says, for example, that the GDP of the UK in 1992 was £595477m. As stated above, the GDP of the UK cannot be defined except in terms of arbitrary recipes. Whereas I might well be able to say that the distance to town and the time taken for my bike ride are measurable to a percent or two, there is absolutely no way of assigning even a *meaning*, let alone a number, to the uncertainty of this tabulated GDP. Yet it is given to 2 parts in a million, a precision to which hardly anything in the comparatively simple field of physics is known. If a similar tabulation of, say, speed records, said that someone flew the Atlantic at 595.477 miles per hour, it would generally be felt to be inappropriate, since the last digit represents 2 yards per hour, perhaps 10 yards in a transatlantic flight. Another (much appreciated) book from my bookshelf (Maddison, 1991) not only tabulates 1989 GDP per head for several countries to 5 digits, it gives the GDP per head of Australia *in the year eighteen hundred and twenty* as 1242 *dollars at 1985 US prices*! The mind reels at the stack of dubious calculations which gave rise to this figure.

Papers on econometrics, written by those who are presumably among the most numerate in the profession, regularly give neat tables of standard errors, t-statistics, etc., to exactly the number of digits, or places after the point, given by their statistical software package, so you might see 0.000001 and 0.076543 in the same column. In a paper already cited (Rowthorn and Ramaswamy, 1997) there happen to be tables (not discussed here) of statistical results in which all entries are given to two decimal places irrespective of significance. Thus there is one entry which reads 6.73 ± 204.80. This general tendency to give meaningless digits could just be laziness, or a desire to keep a neat-looking presentation, justified on the basis that it does not do any harm,

but when a number is drawn out for mention in the text, it often keeps its nonsense digits. In another cited paper (Alexander, 1997), for example, one reads in the conclusions, that "a reduction in inflation from, say, 6% to 2% would imply an improved growth performance of the order of 0.93176%, or close to 1% p.a.". All data in this paper, and more cited in support from another paper, are given to 5 places after the decimal point. This seemingly sweeping criticism has been checked by going through six volumes of Econometrica, one of Journal of Economics and Statistics, and one of the Economic Journal. Of the hundreds of numbers seen in scores of tabulations, hardly any are edited down to the significant digits. It is fairly normal to present a fixed number of places after the point, irrespective of significance. The worst example seen is 0.821890 ± 0.067319138 (Review of Economics & Statistics Vol 76 1994, p137). The error is derived from a t-statistic given to 8 significant figures! Relatively less horrendous examples are very common, such as 26899±22905 (The Economic Journal Vol 105 Jul-Nov 1995, p1460). But even a more defensible example, such as 26.92 ± 1.96 (Econometrica Vol 61 Nos 4-6, p1409), would probably be corrected to 27 ± 2 if quoted thus in an a school pupil's answer to a science examination question.

The famous story that Bertrand Russell gave up economics because it was too easy, Max Planck because it was too difficult, rings true. Russell was a humanist. He meant that he could do the mathematics standing on his head. If had persisted, he would have been a Samuelson. Planck was a physicist. If he could not see where to put his first firm step, he would not take another. He would retire to an easier subject. If he had been led by circumstances to begin the work laid out in Samuelson's Nobel prize-winning work, he would have given up long before p43.

A subject in which it is the norm to write as if you can measure or "determine" (a favourite word) something when you cannot even define it, in which graphs abound with uncalibrated and unquantified axes, is bound to be one in which the aim is to say the plausible thing, not the correct thing, to pass muster with the audience rather than pass the test of truth.

Wefare accountancy recipes

I note in parenthesis that I am not, above, criticising the statistics in the UK government publication, and in Maddison's book, as such. On the contrary, I regard this work as essential and heroic, and Maddison's compilation as particularly valuable and interesting. Nor am I suggesting that the accountancy of transactions which leads to the compilation of a national GDP per year would be better done by an accountancy of things. Objective welfare aggregation is simply impossible, but recipes to produce acceptable numerical comparisons between different places and different times are both useful and necessary. Any number of such recipes is possible. What matters is that one should be chosen, worked out with care, evaluated with dedication, and, above all, standardised. Sir Richard Stone's Nobel Prize in 1984 for the "development of national accounting systems" is, I have no doubt, well merited. What I would like to see in each case is a whole chapter of caveats, and drastic trimming of the data to, at most, the 1 in 1000 standard which is implicit in the generally more sensible presentation of indices (e.g., 106.3), and rates of change (e.g.,

4.0% p.a.). The latter indicates that even compilers of tables might gag at seeing inflation quoted as say 3.987654 % per year.

Discussion

In his preface to "the General Theory", Keynes guessed that his opponents would "fluctuate between a belief that I am quite wrong and a belief that I am saying nothing new". The reaction may be the same to the main argument of this paper, that production of tangible things is primary in the economy. People may readily accept that without the production of things, no non-productive activities, whether intellectual or menial, would be possible, and that this production of things was begun not by philosophers but by people with stone hammers and wooden sticks. But we are all permeated by the notion that the "spiritual" is god-like and that "materialism" is to be deplored. The abstract, the rhetorical, the clever, is more esteemed and less boring than the concrete, the factual and the plodding. Aristotle is undoubtedly more interesting than the slave tilling the fields to produce his food. So the tendency will be to respond with "yes", then with "arguably yes", and then with "it is a point of view", and finally to resume the normal polite academic conversation.

Adam Smith (W of N, Bk 4), comments in similar terms on the difficulty of keeping a focus on things when the cultural current runs strongly towards abstractions. The italics are mine.

"I thought it necessary, though *at the hazard of being tedious*, to examine at full length this popular notion that wealth consists in money, or in gold and silver. Money in common language, as I have already observed, frequently signifies wealth, and this ambiguity of expression has rendered this popular notion so familiar to us that even they who are convinced of its *absurdity* are very apt to forget their own principles, and in the course of their reasonings to take it for granted as a certain and undeniable truth. *Some of the best English writers upon commerce set out with observing that the wealth of a country consists, not in its gold and silver only, but in its lands, houses, and consumable goods of all different kinds. In the course of their reasonings, however, the lands, houses, and consumable goods seem to slip out of their memory,* and the strain of their argument frequently supposes that all wealth consists in gold and silver, and that to multiply those metals is the great object of national industry and commerce."

I hope I need not add that I take issue with Smith in his implication, by the insertion of the word "only", that money is one constituent of wealth. It must be added that Smith himself (like all of us, since we are constrained by the language) has a great tendency to let his own home-truth "slip out of his memory".

Keynes is the most prominent example of the humanist in scientific clothes. He eschewed algebra, but his brilliant self-styled "general theory" (the adjective "general" meant nothing but had echoes of Einstein) was dominated by abstractions. It owed its unique conquest of post-World War II political and academic discourse not to logical coherence or any demonstrable alignment with the facts, but to (lengthy but nevertheless transient) capture of the audience, and to the lucky coincidence of the

"golden age". The IS/LM diagram used for decades as the classroom device for teaching Keynesian theory (but not by Keynes), was the ultimate in uncalibrated free-hand graphs, acknowledged by its inventor (Hicks, 1937) to be, in detail, incomprehensible (Hicks, 1980).

I have used the treatment of "deindustrialisation" to show that the assertion of the primacy of things is not a pedantic one, but one whose implicit denial has led to demonstrably, and indeed blatantly, wrong perceptions. These misperceptions, in turn, if taken seriously enough to be acted upon, would have harmful consequences. When Smith exposed the misperception of gold and silver as wealth, it was to remind his readers of the harmful consequences for Spain of that misperception, and to expose the error of mercantilism, as defined in the last dozen words of the above quotation.

The misperception regarding things runs in every strand of the deindustrialisation question - the failure to define (or in most cases to state clearly that definition is impossible), the pretence that apples and pears can be aggregated, the insistence on talking of the "service sector" as if somehow it was homogeneous and to be weighed in the balance against another quite different and also homogeneous "manufacturing sector", or sometimes a third "agricultural sector", ignoring the obvious fact that the primary agriculture-manufacturing-construction sector, by its productivity increases, both frees bodies to engage in service and provides the things which enable those bodies to multiply their efforts beyond mere muscle-power, and, in reverse, that the workforce of primary sector includes many, perhaps a majority - from accountants to secretaries and doorkeepers - doing work operationally indistinguishable from work done in the service sector. Rowthorn and Ramaswamy go some way to acknowledging this. They say that "product innovation in manufacturing will continue to be important because of the spillovers to productivity growth in services". This comes after the main conclusion that "productivity growth in manufacturing is likely to be less important than it used to be".

The complex reality of human activity - in manufacturing, services and other areas, is given cohesion by the concentration on the role of things. Our society differs from a primitive society only in its inventory of things, in the sense that other apparent differences are entirely mediated by the presence of those things. Wealth is nothing but things. The predominant part of what is denoted by GDP per head which involves services, depends in demonstrable fact entirely on things, and each increment to GDP per head depends entirely on things. Even an increment to welfare outside of the accounting of GDP, say the body-service of a carer within the home, depends on the provision of things - food, shelter and normal comforts - for that carer by someone else.

Those who do not understand this, because of a training which leads away from the real to the abstract, can easily swing from one misperception to the opposite one, that some inflation is good, and later that it is bad, or first maintaining that the decline of manufacturing is a catastrophe, and then, after observing that the catastrophe has not happened, asserting that it is now more important to improve the productivity of services. Even if my view was accepted at the moment of reading, training and habits would soon lead to abstractions and hence to prescriptions, say to foster investment or

technical education. It might then be said that if things are the most important, indeed the only matter of importance, then we must get better at making them. But to see things as primary does not mean intervening in their favour. Services too depend on things. The best arbiter between them is the market as Smith (W of N, Bk 4) said long before the counter-example of the Soviet Union inspired Hayek:

"What is the species of domestic industry which his capital can employ, and of which the produce is likely to be of the greatest value, every individual, it is evident, can, in his local situation, judge much better than any statesman or lawgiver can do for him. The statesman who should attempt to direct private people in what manner they ought to employ their capitals would not only load himself with a most unnecessary attention, but assume an authority which could safely be trusted, not only to no single person, but to no council or senate whatever, and which would nowhere be so dangerous as in the hands of a man who had folly and presumption enough to fancy himself fit to exercise it."

The point of seeing clearly what is primary, and what is consequent, is not to enable better prescriptions by would-be lawgivers, but, in the first place to enable better and more coherent descriptions of economic processes. Wrong descriptions are the basis for wrong actions. Right descriptions may in science and engineering be a basis for right actions, but in the fuzzier subjects it is more likely that they are the basis for *avoiding* wrong actions (cf., Smith again).

There is a problem of a "primary" sector of steadily growing real importance which is at the same time a sector of steadily decreasing (in terms of head-count) social and political importance. This is a difficult idea to promulgate, but obviously there will be harmful consequences if nobody with a public voice even tries to make the voter aware of it. Already, one hears increasingly that "the taxpayer is subsidising farmers at the rate of £x for every family in the country", which is like proposing to saw off a branch of a tree while not noticing that you are sitting on it. How long will it be before the dwindling band of manufacturers is told that they are being subsidised by fashion designers and workers in other such "industries"?

From fact to opinion

All of the above has been based on fact. I regard the primacy or "firstness" of things as having the status of a neutral observation. I now explicitly move to opinion. It is my opinion that the prosperity mediated by the growing flow-rate of things cannot indefinitely be distributed according to titles which are spurious in everything but law. Given that a clever man, say a popular writer, can establish title to more goods than a stupid one, the fact remains that the clever man of today is richer than the clever man of yesterday, not because he is cleverer, but because of the greater volume of today's goods, and that circumstance is due to a small proportion of the population, many of whom may not have benefited at all from their technical or organisational innovations. The operation of the market received a bow above, with regard to the rate at which employment in manufacturing declines, but the same market distributes titles to income, i.e., titles to the purchase of things, in a way which cannot be supported on any basis, except perhaps that it is the best yet thought of. Thus the

fashion designer may proceed to an affluent old age, while the manufacturing (or mining or transport, etc.) entrepreneur or worker who has helped to provide the goods which embody his affluence has, due perhaps to the technical obsolescence of his skills, been thrown into poverty. Or the farmer, who has been paid partly by the end customer and partly by the tax-payer, finds the fashion designer complaining that he has been forced to give up part of his firmly-entitled money "for which I have worked hard" in order to feather-bed a scrounger.

When wealth can be clearly seen as increasing due to no merit on the part of individuals comprising the great majority of the population, it will no longer be tolerable that it is distributed preferentially to people whose "merit" consists of a superior ability to catch and hold on to it. For millennia after the inception of agriculture, this "merit" consisted initially of force, and then of force mediated by the ignorance, superstition and resignation of the ruled. Today, titles to income, that is to things, are awarded in a sort of game in which cleverness, alertness, dexterity, class, luck, cunning, fraud, the ubiquitous threat of force that is present in any orderly state, and to a small extent the actual use of force, all play a part in the innumerable transactions of life in which one person or group wins and another loses (or also wins, but not so much). It may be my "bleak picture", but a new attitude to the re-distribution of income seems to be required.

Conclusions

Economic *theory* is dominated by abstract structures. There is no firm ground or foundation underneath, and no rigorous and detailed contact with reality at the upper extremities. The notions of class and power, left and right, town and country, master and servant are verbally excluded but present everywhere in unspoken and unexamined form. Pangloss is ridiculed in the literary lecture rooms while Pareto is taught uncritically in the economics ones. The worker's wage is a "cost" while the master's profit is not a "cost" but what is left of the revenue after the "costs" are paid. The terms of the lecture or of the examination question, like "money", "interest rate", "unemployment", "demand", "productivity", "recession", "depression", have no acknowledged definition, but no matter - we press on as if they did. Graphs which look like engineering graphs, algebra which looks like engineering algebra, words which sound like scientific words, are used not to represent reality but to convey the author's bid for the attention of the audience.

Goods exchanged in the market are by definition of equal value, so if one good is a thing, and the other a service, these goods are equal. Adding them will give double value. And so we can add everything, apples and pears, performances of opera and lorry loads of gravel, to get the total national output. Things, which are themselves in their infinite and ever-changing variety unevaluable, are weighed against intangibles which can hardly be described, let alone categorised and enumerated. (Marshall has been alone, as far as I know, in briefly despairing of categorising entities which have no definable boundaries - his "Principle of Continuity" - but, reverting to the norm, he extolled its importance only in the preface of his "Principles"). In this world, practitioners can say almost anything so long as it passes muster at the moment of saying. Nobel prizes are won for theories which nobody has ever fully understood,

and which after a time are discarded to be succeeded by further exercises in passing muster. Thus it can be said that inflation is good for growth, and later that it is bad for growth, or that it has no discernible effect whatever, that manufacturing is of paramount importance or that its disappearance is perfectly natural, that the performing arts will cost themselves out of existence or that we shall all do little else, that agriculture is backward, or that it is dynamic, either being a reason for its being a source of labour. These examples concern matters of fact - inflation is not as a matter of fact correlated with growth, manufacturing is as a matter of fact of paramount importance, the performing arts can as a matter of historical and logical fact continue in spite of continually rising relative costs, agriculture is as a matter of fact an area of fast-growing productivity - but the debate seems to accept without embarrassment that all opinions are possible, while adopting the style of science in delivering each conclusion as if it was a fact. If and when an opinion captures the audience, it is then taught as a fact, and students are rated on how well they can reproduce the fashionable story as fact. The closest parallel is perhaps with theology, where also each practitioner presents his story as fact, to be learned by the acolytes, but there are many differing stories.

This paper has illustrated this theme. It has pointed out the obvious - that it is things which are the primary measure, literally the *sine qua non*, of all material, cultural and intellectual progress. While it may be accepted that the journeyman tasks which lie behind official statistics - in which one opera performance equals 100 lorryloads of gravel - are essential, it is an error, in the sense of being a misperception leading to wrong action, to mistake this equality as more than a necessary procedural fiction. The gravel is part of the primary inventory, the opera and all other intangibles are secondary or consequential. This inversion of the important and the estimable lies behind the paradox of the deindustrialisation which is in process and the deagriculturalisation which has already run its course in some parts of the world - namely that our entire civilisation rests (and logically and factually must always rest) on the output of this disappearing sector. Ultimately, the sector which lies behind all value will appear in the statistics as one which adds zero value in current terms. Fortunately, the real word of affairs shows no sign of acting on this erroneous perception. For those accustomed to see the world in abstractions, misperceptions still seem to obscure the reality.

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