

Computers and Economic Democracy

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Introduction

Forty years ago there was little doubt in the minds of socialists that planning was way of the future. This was borne out by the rapid advance of the planned economies, which with Sputnik and Gagarin seemed to outpace the muddled inefficiency of capitalist economies. Today of course the picture looks different.

In the face of the collapse of Soviet power at the end of the 80s, left wing authors seemed to have no ready response.

In fact, however, the very advances in information technology that are taken to symbolise the triumph of the market, hold even more potential for a rational and democratic socialism. This fact promise, is we think, now beginning to be understood by the movement for economic democracy.

Since the late 80s we have been arguing that there is an intellectually coherent and practical alternative to the philosophy of neo-liberalism. Our basic proposals can be laid out quite simply, although we ask the reader to bear in mind that we do not have space here for the necessary refinements, qualifications and elaborations (these are developed at length in Cockshott and Cottrell, 1993). In schematic form the proposals are as follows.

Thesis 1 *The collapse of previously existing socialism was due to identifiable causes embedded in its economic mechanism, but which are not inherent in all possible socialisms.*

Thesis 2 *Marxist economic theory, in conjunction with information technology provide the basis on which a viable socialist economic program can be advanced.*

Thesis 3 *The socialist movement has never developed a correct constitutional program. In particular it has accepted the misconception that elections are a democratic form.*

1 Historical failings

The collapse of previously existing socialism was due to identifiable causes embedded in its economic mechanism, but which are not inherent in all possible socialisms.

We will examine some of the well known contradictions within the economics of previously existing socialism. The argument that these are not inherent in any socialism will be advanced in section 2.

Elaboration 1.1 *The mechanism for the extraction of a surplus product progressively collapsed resulting in inadequate investment.*

Marxist economics views the method of extracting a surplus product as being the distinguishing feature of a mode of production.

The specific economic form, in which unpaid surplus labour is pumped out of the direct producers determines the relationship of rulers and ruled, as it grows directly out of production itself and, in turn, reacts upon it as a determining element. Upon this, however, is founded the entire formation of the economic community which grows up out of the production relations themselves, thereby simultaneously its specific political form. It is always the direct relationship of the owners of the conditions of production to the direct producers - a relation naturally corresponding to a definite stage in the development of the methods of labour and thereby its social productivity, - which reveals the innermost secret, the hidden basis of the entire social structure, and with it the political form of the relation of sovereignty and dependence, in short, the corresponding specific form of state. *See MARX 1972,p 791*

In a socialist economy the extraction of a surplus product takes place by means of a **politically determined division of the material product between consumer goods and other products in the state plan**. This is socialism's " innermost secret, the hidden basis of the entire social structure ".

Its system of extracting a surplus is quite different from under capitalism in the following respects:

- The division of the product is determined directly in material terms rather than indirectly as a result of exchange relations.
- The division is determined centrally rather than through numerous local bargains over the price of labour power, hours worked etc.
- The actual level of money wages is irrelevant because the supplies of consumer goods are predetermined in the plan. Higher money wages do not necessarily result in increased real wages. Besides which a large part of the real wage is in the form of free or subsidised goods.

This form of extraction rises out of the highly integrated and socialised character of production under socialism. From it is developed the absolute necessity of individual factories being subordinated to the center, and the comparative irrelevance of their individual profitability. Following on it determines the centralised character of the state and the impossibility of local authorities having an autonomous disposition over resources. All these are invariant characteristics of socialism.

This innermost secret determines the relationship of rulers and ruled as follows; consider two possibilities, either the rulers and the ruled are distinct groups, or they are one and the same.

If, as in hitherto existing socialism, they are distinct, then whoever controls the planning authority is both the effective owner of the means of production, and a ruler. These rulers (in practice have the central committee of the communist party), though often venal, can not fulfill their social function by the shameless bourgeois pursuit of self interest. They are compelled instead, to take on the highly social and public role, of so organising the political and ideological life of the society, as to ensure compliance with the plan. One of the most effective ways of doing this is through the cult of a charismatic leader, backed to a greater or lesser extent by state terror.

Personality cults, in which the leader is presented as the General Will incarnate are no accident, but an efficient adaptation to the contradictory demands of a socialist mode of production (which dictates the dominance of political over civil society), combined with institutions of representative government.

Some readers may protest at this point: it is bad enough that we unblushingly characterize the Leninist system as socialist, but how can we say that it had a representative government?

Representative government selects certain humans, commonly called politicians, to stand in for, or represent, others in the process of political decision making. This is just what the Leninist party does in power. It acts as a representative of the working class and takes political decisions on its behalf. As such it is no less representative a form of government than parliamentary government, there are differences over who is represented and how they are represented, but the representative principle remains the same: decisions are not taken by those affected but are monopolized by a group of professional rulers, whose edicts are legitimated in terms of some representative function. Selection of such rulers by multiple party elections can not diminish their representative character nor abolish the distinction between rulers and ruled.

The contradictory character of socialist representative government is banally evident. The representatives of the proletariat, through their control of the plan, and thus the method by which unpaid surplus labour is pumped out of the direct producers, become effective controllers, *pro tem*, of the means of production. As such their individual class position is transformed and their ability to go on representing the proletariat, compromised.

Only if the distinction between ruler and ruled is abolished, when the masses themselves decide all major questions through institutions of participatory democracy does the totalitarian inner secret at the heart of socialism cease to be contradictory. Only when the masses in referenda decide the disposition of their collective social labour : how much is to go on defence, how much on health, how much on consumer goods etc, can the political life of socialism cease to be a fraud.

But to return to the question of surplus extraction. Under socialism this is an inherently totalitarian process, a subordination of the parts to the whole, the factory to the plan, the individual to the collective. Production is not for private

gain but for the totality of society. Under a system of participatory democracy, this totalitarian conformism might take on a Swiss democratic rather than German fascist air, but it would be no less real.

Gorbachov undermined the whole surplus extraction process by attacking the totalitarian principle. One of his first measures was to allow factories to retain the greater part of their profit. At a stroke, he introduced an antagonistic bourgeois principle of surplus extraction: the pursuit of profit by individual enterprises. He threw the whole system into chaos.

The government, deprived of its main form of revenue, resorted to the printing press. The result was hyperinflation.

The factories had extra money, but, since the division of the social product was still determined by the plan, could not act as private firms would and convert this new money into productive capital. The socialist system of surplus extraction was sabotaged without a bourgeois one to replace it, and the economy spiraled into an inflationary decline.

Elaboration 1.2 *Previously existing socialism was limited by a deficient system of economic calculation.*

This point is made by all right wing critics. They point out, with justification, that the price system operating in the USSR made rational economic calculation impossible. Numerous anecdotes tell of this:

Here is one of many examples. Some time ago it was decided to adjust the prices of cotton and grain in the interests of cotton growing, to establish more accurate prices for grain sold to the cotton growers, and to raise the prices of cotton delivered to the state. Our business executives and planners submitted a proposal on this score which could not but astound members of the Central Committee, since it suggested fixing the price of a ton of grain at practically the same level as a ton of cotton, and, moreover, the price of a ton of grain was taken as equivalent to that of a ton of baked bread. In reply to the remarks of the members of the Central Committee that the price of a ton of bread must be much higher than that of a ton of grain, because of the additional expense of milling and baking, and that cotton was generally much dearer than grain was also borne out by their prices in the world market, the authors of the proposal could find nothing coherent to say.

So wrote Stalin in April 1952 [Stalin 1952], but some 40 years later, pricing policy had improved so little that Gorbachov could cite the example of pigs being fed bread by collective farmers, because the price of bread was lower than that of grain.

When the relative prices of things differs systematically from their relative costs of production, it becomes impossible for people to choose cost effective methods of production. This produces a general decline in economic efficiency.

Elaboration 1.3 *Unlike capitalism, previously existing socialism lacked an inbuilt mechanism to economise on the use of labour, and thus to raise its productivity.*

The fundamental economic justification of any new production technology has to be its ability to produce things with less effort than before. Only by the constant application of such inventions throughout the economy can we gain more free time to devote either to leisure or to the satisfaction of new and more sophisticated tastes. This implies that in socialist production workers must seek always to economise on time. Time is, as Adam Smith said, our original currency by which we purchase from nature all our wants and necessities, a moment of it needlessly squandered is lost for ever. A socialist system will only be historically superior to capitalism if it proves better at husbanding time.

The wealth of capitalist societies is of course unevenly divided, but its in-built tendency to advance the productivity of labour underpins the continuing progressive role of capitalist economic relations. Had capitalism lost this potential, as some Marxists believed in the 1930's then it would long ago have lost out in competition with the Soviet block.

In a capitalist economy, manufacturers are driven by the desire for profit to try to minimise costs. These costs include wages. Firms often introduce new technology in order to cut the workforce and reduce labour costs. Although this use of technology is frequently against the direct interest of workers, who lose their jobs, it is to the ultimate benefit of society. For it is through these economies in labour that the living standards of the society is raised. The benefits of technical change are unevenly spread, the employer stands to gain more than the employee, but in the end, it is upon its ability to foster technological improvements that capitalism's claim to be a progressive system is based. The need to accept new labour saving technology is generally recognised within the Trades Unions, who seek only to regulate the terms of its introduction so that their members share in the gains.

It is a very naive form of socialism that criticises technical change under the pretext that it causes unemployment. The real criticism that can be levied at capitalist economies in this regard is that they are too slow to adopt labour saving devices because labour is artificially cheap.

A good example of this could be seen in the computer industry. In the 1950s IBM developed highly automated machinery to construct the core memories for their computers. As demand grew their factories became more and more automatic. In 1965 they even had to open an entire new production line just to make the machines that would make the computers. Still they could not keep up with demand.

The situation was becoming desperate. Then a newly appointed manager at Kingston who had spent several years in Japan, proposed that workers in the Orient could be found with sufficient manual dexterity and patience to wire core planes by hand. Taking bags of cores, rolls of wire, and core frames to Japan, he returned ten days later with hand wired core planes as good as those that had been wired by automatic wire feeders at the Kingston plant.

It was slow and tedious work but the cost of labor in the Orient was so low that production costs were actually lower than with full automation in Kingston. *See Pugh 1991, p209*

But in this respect the USSR was even worse.

The USSR subsidised food, rent, children's clothes and other necessities. The subsidy on basic goods compensated for low money wages. But subsidies, and social services had to be paid for out of the profits of nationalised industries (which formerly met most of the Soviet budget). For these to make a profit, wages had to be kept low, and low wages meant that the subsidies had to be retained!

The worst aspect of all this was that enterprises were encouraged by the cheapness of labour to be profligate with it. Why introduce modern automated machinery if labour was so cheap? Besides, it created work and prevented unemployment: real voodoo economics. True enough, any socialism worthy of the name must prevent unemployment, but that is not the same as creating unnecessary work. Its better to automate as fast as possible whilst reducing the working week.

Elaboration 1.4 *Nationalised ownership of industry held back international economic cooperation in comparison to the capitalist world.*

Modern capitalist industry is dominated by big multinational firms. Only these have the resources and size of market to reap economies of scale and meet the heavy research costs demanded by competition. The nationalised enterprises of Eastern Europe and to a lesser extent the USSR were just too small to gain such benefits.

2 Is planning still possible?

Marxist economic theory, in conjunction with information technology provide the basis on which a viable socialist economic program can be advanced.

This is obviously a complex case to make out, and we can only give a few key points here.

Proposition 2.1 *Using modern computers it is possible to efficiently plan an economy in terms of natural units without recourse to the intermediary of money or markets.*

Ever since the 1920's bourgeois economists had been claiming that the problems of economic calculation involved with planing an economy were so complex that they could not be done. It was claimed that without the feedback mechanisms of the market decision making would be arbitrary and inefficient.

Whilst the Soviet economy had a rate of growth well in excess of the west these ideas did not seem very plausible. But when that its economy became more complex, and growth slowed, these criticisms seemed to gain relevance.

It did seem plausible that a central planning agency could no longer cope with the myriad detail of a modern economy.

Elaboration 2.1 *Computerised input/output processing is the technique for detailed plan preparation.*

For the last decade or so we have been researching the possibilities of using modern computers to solve planning problems. We believe that it can now be conclusively demonstrated that the liberal arguments against socialist planning are outdated.¹ The problems of calculation that seemed daunting in the past can now be readily handled by super-computers.

If you think of a capitalist country one of the biggest users of computers is the financial sector. We have all seen TV footage of the money dealing rooms in the City banks where each desk seems to be crammed with a number of screens that is positively indecent. In contrast, main economic use of computers under socialism should be the simulation of detailed plans. In the USSR, the planning authority GOSPLAN was for some years a heavy user of mainframe computers.

In theory since GOSPLAN controlled all of industry, it should have been able to exactly balance the needs and requirements of different industries. If it knew how many personal computers and how many mainframes it had ordered the computer manufactures to produce it would know exactly how many memory chips were going to be needed for that. It could order the semiconductor factories to turn out just that number of chips to the right specification. Theoretically this should be better than the situation in the West where the separate plans of computer and chip manufactures lead to periodic 'memory chip droughts'.

The theory seemed born out up until the about the mid 60's. Up until then the Russians out-performed the West in terms of economic growth. Then the scale of the economy just got too big for the planners to handle. There were too many different products to keep track of. It was beyond the capability of a human bureaucracy to balance the plans. Shortages of some products were combined with overproduction of others.

In the '60s economic cyberneticians had pointed out that the mathematical requirements for planning an economy were well understood. If it was beyond human capability you just needed to program computers to do it.

The results of trying to do this were disappointing. Of course it was not just in the USSR that the benefits of computerisation were greatly oversold in the '60s. Over here too, people attempted things that were really way beyond the rather limited abilities of the computers then available but since then the growth in computer speed has been astronomical. A modern supercomputer is about 100,000 times faster than its 1960's counterpart.

Many people are now familiar with the spreadsheet programs like Excel that are used on personal computers to prepare company plans. The problem

¹For a longer presentation of the argument see Cockshott 1990, Cottrell 1989.

of drawing up a plan for an economy can be thought of as a giant spreadsheet or matrix.

The rows of the the spreadsheet represent the different economic activities, the columns represent the products used by these activities. If the first row represented electricity production and the second represented oil production then [row 1, col 2] would be the amount of oil used to produce electricity and [row 2, col 1] the amount of electricity used to produce oil.

The last column of the spreadsheet will hold the total amount produced by each process, so many tera-kilowatt hours of electricity and so many hundred million barrels of oil etc. The bottom row of the spreadsheet shows the total inputs of each product used in all the production processes.

The problem is to ensure that the total output of each product is not less than the total use of that product.

What you know to start off with are the technical properties of the processes, one barrel of oil produces so many kilowatt hours. You also know what your stock of capital goods and means of production are at the start of the year. What you must do is allocate these to different production processes in such a way as to meet the above constraint.

The standard approach to this is to treat it as a linear programming problem and solve it using the simplex method(see Bland). The problem with this is the running time of an algorithm based on the simplex method will grow with the cube of the number of industries considered. Suppose there were 10 million distinct products made in a continental economy. Then you are talking of some 10^{21} computer instructions to solve the problem. This is too big even for the fastest computer.

What Soviet economic planners resorted to was running smaller spreadsheets. They handled only a few thousand key products and ran these through their mainframe computers as linear programs. For these the equations can be solved. This explains one of the strengths of the Russian economy. It did well on certain key projects like the space program which can be given priority in the planning process. But there just is not the computer power available to apply the same techniques more widely.

Elaboration 2.2 *When faced with an intractable problem in computation there are two approaches: throw more computer power at it or devise a more efficient program.*

The problem of economic planning is so complex that both approaches are necessary. The best that could be hoped for is a program whose running time rises in direct proportion to the size of the problem.

In planning terms this would mean a computer program whose running time was proportional to the number of products rather than the cube of the number of products. But when the number of products is up around 10 million you need a hugely powerful machine just to store the initial data, let alone perform the computation.

There do exist algorithms that have the desired properties we discuss them in Cocshott and Cottrell 1993. On the sorts of supercomputers now available,

one would be talking of computer programs that would take a few hours to run. This is modest compared to what physicists do with computers.

There is no technical reason why any continental sized economy now could not have a completely planned system. Each work place would have PCs linked to a network of computers within the enterprise which would in turn be linked to a Continent wide network of supercomputers. The work place would build up a local spreadsheet of its production capabilities and raw materials requirements. These would be transmitted through the hierarchy of machines which would balance up supplies and demands and draw up plans accordingly. Effective central planning requires the following basic elements:

1. A system for arriving at (and periodically revising) a set of targets for final outputs, which incorporates information on both consumers' preferences and the relative cost of producing alternative goods (the appropriate metric for cost being left open for the moment).
2. A method of calculating the implications of any given set of final outputs for the the required gross outputs of each product. At this stage there must also be a means of checking the feasibility of the resulting set of gross output targets, in the light of the constraints posed by labour supply and existing stocks of fixed means of production, before these targets are forwarded to the units of production.

The provision of these elements involves a number of preconditions, notably an adequate system for gathering and processing dispersed economic information and a rational metric for cost of production. We should also note at once the important and entirely valid point stressed by Nove (1977 and 1983): for effective central planning, it is necessary that the planners are able to carry out the above sorts of calculations in full disaggregated detail. In the absence of horizontal market links between enterprises, management at the enterprise level "*cannot* know what it is that society needs unless the centre informs it" (Nove, 1977: 86).² Thus if the centre is unable to specify a coherent plan in sufficient detail, the fact that the plan may be 'balanced' in aggregate terms is of little avail. Even with the best will in the world on the part of all concerned, there is no guarantee that the specific output decisions made at the enterprise level will mesh properly. This general point is confirmed by Yun (1988: 55), who states that as of the mid-1980s Gosplan was able to draw up material balances for only 2,000 goods in its annual plans. When the calculations of Gosplan and the industrial ministries are included, the number of products tracked rises to around 200,000, still far short of the 24 million items produced in the Soviet economy at the time. This discrepancy meant that it was "possible for enterprises to fulfill their plans as regards the nomenclature of items they have been

²With one reservation. If, say, the central plan calls for enterprise A to supply intermediate good x to enterprise B, where it will be used in the production of some further good y , and if the planners apprise A and B of this fact, is there not scope for 'horizontal' discussion between the two enterprises over the precise design specification of x ? (That is, even in the absence of market relations between A and B.)

directed to produce, failing at the same time to create products immediately needed by specific users”.

Our argument below involves grasping this particular nettle: while we agree that “in a basically non-market model the centre must discover what needs doing” (Nove, 1977: 86), and we accept Yun’s account of the failure of Gosplan to do so, we dispute Nove’s contention that “the centre cannot do this in micro detail” (*ibid.*). Planners, he asserts, are forced to work in terms of aggregates. They can only specify general targets like ‘we need 500 million screws’, but they fail to say how many 5mm screws, 10mm screws etc, are needed. As a result the wrong mix of screws gets produced.

What would have been an impossibly complex problem to solve by the old bureaucratic means, has become an eminently practical proposition using modern information technology. Such a computerised planning system could respond to events far faster than any market could hope to do, thus undermining the main objection raised by bourgeois economists as to the unwieldy nature of socialist planning.

Proposition 2.2 *Socialism requires the abolition of money and its replacement by a system of remuneration based on labour time. This is the key to promoting both equity and technological advance.*

It is clear both from a reading of Marx’s own work, and from the whole tenor of 19th century socialism, that it was a common assumption that socialism would involve the abolition of money and the introduction of a system of payment based on labour vouchers.

..., the individual producer receives back from society - after the deductions have been made - exactly what he gives to it. What he has given to it is his individual quantum of labour. For example, the social working day consists of the sum of the individual hours of work; the individual labour time of the individual producer is the part of the social working day contributed by him, his share in it. He receives a certificate from society that he has furnished such and such an amount of labour (after deducting his labour for the common funds), and with this certificate he draws from the social stock of consumption as much as the same amount of labour costs. The same amount of labour which he has given to society in one form he receives back in another. *See Marx 1875*

Marx qualified this as being only a first step towards greater equality, but it is far more radically egalitarian than anything achieved by hitherto existing socialism. The principle of payment in labour time recognizes only two sources of inequality in income: that some people may work longer than others, or, in a piece work system, some may work faster. It eliminates all other income inequalities based upon class, race, sex, grade or professional qualification.

Also, by forcing workplaces to pay workers the the full value created by their labour, it eliminates the squandering of labour brought about by low

pay, and encourages the introduction of labour saving innovation. It provides, moreover, a rational and scientifically well founded basis for economic calculation. If goods are labelled with the labour required to make them, the arbitrary and irrational character of the old Soviet price system is avoided.

Proposition 2.3 *It is theoretically and technically possible to compute labour values to within the degree of accuracy required for practical purposes.*

The proposals above rest on the assumption that it is possible to calculate the labour content of each product in the economy. The problem is in principle solvable since one has n unknown labour values related by a set of n linear production functions. The difficulty is not one of principle but of scale. When the number of products gets up into the millions, the calculation involved is nontrivial.

If we were to represent the problem in classic matrix terms, with an n by $(n + 1)$ matrix, where the rows represent products and the columns represent produced inputs plus direct labour, analytic solution of the equations using Gaussian elimination gives a problem requiring n^3 multiplication operations and a slightly larger number of additions and subtractions. Table 1 gives the computer requirements for this calculation assuming differing sizes of economy. We assume that the uniprocessor is capable of 10^8 multiplications a second, and that the multiprocessor can perform 10^{10} multiplications per second.

Number of products	Multiplications	Time taken in seconds:	
		Uniprocessor	Multiprocessor
1,000	1,000,000,000	10	0.1
100,000	10^{15}	10^7	100,000
10,000,000	10^{21}	10^{13}	10^{11}

Table 1: Gaussian solution to labour values

It can be seen that, taking compute time alone into account, even the multiprocessor would take 10^1 seconds, or over three thousand years, to produce a solution for an economy of 10 million products. As if this were not enough, the situation would be further complicated by the memory required to store the matrix, which grows as n^2 . Since the largest currently feasible memories are of the order of 10^{10} words, this would set a limit on the size of problem that could be handled at about 100,000 products.

If, however, we take into account the sparseness of the matrix (i.e. the high proportion of zero entries, when it is specified in full detail) the problem becomes more tractable. Let us suppose that the number of different types of components that enter directly into the production of any single product is n^k where $0 < k < 1$. If we assume a value of 0.4 for k , which seems fairly conservative,³ we find that memory requirements now grow as $n^{(1+k)} = n^{1.4}$. If we can

³This means, for instance, that in a 10 million product economy each product is assumed to have on average 631 direct inputs.

further simplify the problem by using iterative numerical techniques (Gauss–Seidel or Jacobi) to obtain approximate solutions, we obtain a computational complexity function of order $An^{1.4}$, where A is a small constant determined by the accuracy required of the answer.

This reduces the problem to one that is clearly within the scope of current computer technology, as shown in Table 2. The most testing requirement remains the memory, but it is within the range of currently available machines.

Number of products	Multiplications	Words of memory	Time taken in seconds:	
			<i>Uniprocessor</i>	<i>Multiprocessor</i>
1,000	158,489	31,698	1.6×10^{-3}	1.6×10^{-5}
100,000	100,000,000	20,000,000	1	0.01
10,000,000	6.3×10^{10}	1.2×10^{10}	630	6.3

Table 2: Iterative solution to labour values (Assuming $A=10$)

From this we conclude that the computation of labour values is eminently feasible.

Proposition 2.4 *Consumer goods prices should be set at market clearing levels and the discrepancies between these prices and the values of goods used to determine the optimal levels of production.*

Given that supplies of and demand for goods is never exactly equal, it is only average prices that should equal labour values. Individual items in short supply would sell at a premium, balanced by those in oversupply selling at a discount. These premiums and discounts can then guide the planning authorities to decide which goods to produce more of, and which to produce less off.

Note that this does not in anyway presuppose the existence of private trade. Our proposal on this count might be described as ‘Lange plus Strumilin’. From Lange we take up a modified version of the ‘trial and error’ process, whereby market prices for consumer goods are used to guide the re-allocation of social labour among the various consumer goods; from Strumilin we take the idea that in socialist equilibrium the use-value created in each line of production should be in a common proportion to the social labour time expended.⁴ The central idea is this: the plan calls for production of some specific vector of final consumer goods, and these goods are marked with their social labour content. If planned supplies and consumer demands for the individual goods happen to coincide when the goods are priced in accordance with their labour values, the system is already in equilibrium. In a dynamic economy, however, this is unlikely. If supplies and demands are unequal, the ‘marketing authority’ for consumer goods is charged with adjusting prices, with the aim of achieving

⁴This point—a basic theme of Strumilin’s work over half a century—is expressed particularly clearly in his (1977: 136–7).

(approximate) short-run balance, i.e. prices of goods in short supply are raised while prices are lowered in the case of surpluses.⁵ In the next step of the process, the planners examine the ratios of market-clearing price to labour value across the various consumer goods. (Note that both of these magnitudes are denominated in labour-hours; labour content in the one case, and labour tokens in the other). Following Strumilin's conception, these ratios should be equal (and equal to unity) in long-run equilibrium. The consumer goods plan for the next period should therefore call for expanded output of those goods with an above-average price/value ratio, and reduced output for those with a below-average ratio.⁶

In each period, the plan should be balanced, using either input-output methods or an alternative balancing algorithm.⁷ That is, the gross outputs needed to support the target vector of final outputs should be calculated in advance. This is in contrast to Lange's (1938) system, in which the very coherence of the plan—and not only its optimality—seems to be left to 'trial and error'. Our scheme, however, does not impose the unreasonable requirement that the pattern of consumer demand be perfectly anticipated *ex ante*; adjustment in this respect is left to an iterative process which takes place in historical time.⁸

This scheme meets the objection of Nove (1983), who argues that labour values cannot provide a basis for planning even if they gave a valid measure of cost of production. Nove's point is that labour content of itself tells us nothing about the use-value of different goods. Of course this is true,⁹ but it only means that we need an independent measure of consumers' valuations; and the price, in labour tokens, which roughly balances planned supply and consumer demand provides just such a measure. By the same token, we can answer a point made by Mises in his discussion of the problems faced by socialism under dynamic conditions (1951: 196ff). One of the dynamic factors he considers is change in consumer demand, à propos of which he writes: "If economic calculation and therewith even an approximate ascertainment of the costs of production were possible, then within the limits of the total consumption-units assigned to him, each individual citizen could be allowed to demand what he liked..." But, he continues, "since, under socialism, no such calculations

⁵With market-clearing prices, of course, the goods go to those willing to pay the most. Given an egalitarian distribution of income, we see no objection to this.

⁶Naturally, an element of demand forecasting is also called for here: the current ratios provide a useful guide rather than a completely mechanical rule.

⁷An alternative algorithm which makes allowance for given stocks of specific means of production is given in Cockshott (1990).

⁸In his later reflection on the socialist calculation debate, Lange (1967) seems to suggest that an optimal plan can be pre-calculated by computer, without the need for the real-time trial and error he envisaged in 1938. Insofar as this would require that consumer demand functions are all known in advance, this seems to us far-fetched.

⁹As was clearly understood by Marx: "On a given basis of labour productivity the production of a certain quantity of articles in every particular sphere of production requires a definite quantity of social labour-time; although this proportion varies in different spheres of production and has no inner relation to the usefulness of these articles or the special nature of their use-values." (1972: 186-7)

are possible, all such questions of demand must necessarily be left to the government". Our proposal allows for precisely the consumer choice that Mises claims is unavailable.

Proposition 2.5 *The funding of the surplus product should come from taxes on income, approved by referendum.*

In any society a certain proportion of the social product must be set aside for investment and to support those unable to work etc. In a socialism based on labour values, this would be expressed as a deduction of so many hours work a week that had to be performed for the community. If the phrase had not been purloined, one might call it the community charge.

In the countries of hitherto existing socialism the decision as to how the social working day was to be divided between necessary and surplus labour time was taken by the government. As, over time, the government became alienated from the working classes, the process became exploitative. The state as an alien power was depriving the workers of the fruits of their labour.

To prevent this, it is essential, that the division of the working day between social and necessary labour, be decided by the working class itself; rather than by a government which claims to act in its interests. There should be an annual vote by the working population to decide on the level of the tax. A multiple choice ballot could allow the people to decide between more public services or more consumption.

Only when the surplus product is provided voluntarily does it cease to be exploitation.

3 Democracy Planning and the Internet

The socialist movement has never developed a correct constitutional program. In particular it has accepted the misconception that elections are a democratic form.

The same electronic technology that makes planning feasible enables direct democratic control over the planning process. It is now quite feasible to provide every household with an Internet terminal¹⁰ that people could use to vote on what sort of plans they want.

Using the wealth of up to date economic data that the planning networks gathered, together with the power of super-computers, rival political parties could simulate different continental plans. Each would provide full employment but be directed towards different ends: improving public transport, investing more in industry, implementing energy saving measures, improving housing conditions, etc. These could be debated on TV and in the media. On-line databases would allow citizens to query the implications of the different plans.

¹⁰Limited capability Internet terminals can be cheaply built into TV sets.

People could then use their Internet terminals to vote for which of these development plans they wanted; knowing that the various alternatives had been thoroughly costed and proved feasible.

Proposition 3.1 *Soviets and elections on universal suffrage are both ultimately aristocratic forms of government.*

Aristocracy means rule by the best.

In a feudal society, landowners are self evidently the best, most honorable, most noble elements of society. But this does not limit aristocracy as a principle to feudalism. Aristocracy simply means an elitist system of government.

Aristotle argued that any political system based upon elections was an aristocracy. (See Aristotle pp 286). It introduces the deliberate element of choice, of selection of the best, the *aristoi*, in place of government by all of the people. What he implies, as would be evident to any Marxist, is that the 'best' people in a class society will be the better off. The poor, the scum and the riff-raff are of course 'unsuitable' candidates for election. Wealth and respectability go together.

In a bourgeois parliamentary system this *aristoi* is comprised in the main of men of high social status: lawyers, business men etc. In a soviet system the *aristoi* who get elected onto the local soviets, and still more those who get promoted from the local to the supreme soviets, are initially the elite of the working class. They are the politically active, the class conscious, the self-confident, in short, activists of the Communist Party.

The leading role of the Communist Party, translates it, in an electoral mechanism with a purely proletarian constituency, into the aristocracy of labour. As such it becomes prey to the characteristic corruptions of aristocracy. Soviets, based as they are on the electoral principle, transform themselves from instruments of proletarian democracy into their opposite.

This degeneration is not accidental, not to be explained away by historical contingencies, but inevitable.

Elaboration 3.1 *Democracy is an ancient term for a type of popular rule based upon mass assemblies and selection of officials by lot. What has come to be termed democracy in the 20th century has almost nothing in common with this original meaning.*

The political systems that currently label themselves democracies are all oligarchies. The fact that they can still get away with calling themselves democracies is one of the most remarkable confidence tricks in history. (See Finlay 1985).

In his dystopian novel '1984' Orwell makes ironic reference to Newspeak, a dialect of English so corrupted that phrases like 'freedom is slavery' or 'war is peace' could pass unremarked. What he was alluding to is the power of language to control our thoughts. When those in authority can redefine the meanings of words they make subversion literally unthinkable. The phrase 'parliamentary democracy' is an example of newspeak: a contradiction in disguise. Go back to the Greek origins of the word democracy. The second half

of the word means 'power' or 'rule'. Hence we have autocracy ; rule by one man; aristocracy, rule by the aristoi the best people, the elite; democracy meant rule by the demos. Most comentators translate this a rule by the people, but the word demos had a more specific meaning. It meant rule by the common people or rule by the poor. Aristotle, describing the democracies of his day was quite explicit about the fact that democracy meant rule by the poor. Countering the argument that democracies simply meant rule by the majority he gave the following example:

Suppose a total of 1,300; 1000 of these are rich, and they give no share in office to the 300 poor, who are also free men and in other respects like them; no one would say that these 1300 lived under a democracy

(Politics 1290).

But he says this is an artificial case, "**due to the fact that the rich are everywhere few, and the poor numerous.**" As a specific definition he gives:

A democracy exists whenever those who are free and are not well off, being in a majority, are in sovereign control of the government, an oligarchy when control lies in the hands of the rich and better born, these being few.

In the original meanings of the words what exists even in countries that are termed parliamentary democracies is oligarchy not democracy. In its origins, 'democracy' meant rule by the working poor. In modern language : workers power or proletarian rule (the proles being the latin equivalent of the greek demos). We can see how far a parliamentary system is from a democracy in practice by looking at the actual institutions of the *demokratia* .

The first and most characteristic feature of *demokratia* was rule by the majority vote of all citizens. This was generally by a show of hands at a sovereign assembly or *eklesia*. The sovereignty of the *demos* was not delegated to an elected chamber of professional politicians as in the bourgeois system. Instead the ordinary working people, in those days the peasantry and traders, gathered together en masse to discuss, debate and vote on the issues concerning them. The similarity between the *eklesia* and those spontaneous organisations of modern workers democracy: the mass strike meetings that are so hated by the bourgeois world, is immediately apparent.

The second important institution were the peoples law courts or *dikasteria*. These courts had no judges, instead the dicasts acted as both judge and jury. The dicasts were chosen by lot from the citizen body, using a sophisticated procedure of voters tickets and allotment machines, and once in court decisions were taken by ballot and could not be appealed against. It was regarded by Aristotle that control of the courts gave the *demos* control of the constitution.

There was no government as such, instead the day to day running of the state was entrusted to a council of officials drawn by lot. The council had no legislative powers and was responsible merely for enacting the policies decided upon by the people.

Participation in the state was restricted to citizens. This excluded women, slaves and *metics* or in modern terms resident aliens.

Only where skill was essential, as with military commanders, was election considered safe. The contrast with our political and military system could not be more striking.

A neo-classical democracy would still be a state in the Marxian sense. It would be an organised public power, to which minorities are forced to submit. The *demos* would use it to defend their rights against any remaining or nascent exploiting class. But it would be acephalous: a state without a head of state, without the hierarchy that marks a state based on class exploitation.

The various organs of public authority would be controlled by citizens' committees chosen by lot. The media, the health service, the planning and marketing agencies, the various industries would have their juries. Each of these would have a defined area of competence. A committee for the energy industry, for instance, would decide certain details of energy policy but it could not disregard a popular vote, say, to phase out nuclear power. The membership of the committees need not be uniformly drawn from the public. The health service committees could be made up partly of a random sample of health service workers, and partly of members of the public. As Burnheim argues, the principle should be that all those who have a legitimate interest in the matter should have a chance to participate in its management.

This view is radically different from both Social Democracy and the practice of hitherto-existing socialism. Planning, for example, is not under government control but under a supervisory committee of ordinary citizens, who, since they are drawn by lot, will be predominantly working people. In the sense that they are autonomous of any government, these committees can be thought of as analogous to the autonomous bodies of bourgeois civil society: independent central banks, broadcasting authorities, arts councils, research councils etc. It is not necessary for them to be under direct state control; their charters and the social backgrounds of their governors ensure their function. Provided that the socialist analogues of such authorities have founding charters open to popular amendment, that they have supervisory committees who are socially representative of the people, and that their deliberations are public, popular control would be assured.

The powers of demarchic councils would be either regulatory or economic or both. An advanced industrial society requires a complex body of regulations to function. In present society some of these regulations are what we recognise as laws, emanating from the decisions of politicians and enforced by state power, but a larger part already originate in autonomous bodies. Professional organisations define codes of practice binding on their members. Trade organisations define standards for industrial components, something absolutely essential for rapid technological progress. International bodies define standards for the exchange of electronic data by telephone, telegraph and fax.

In many cases these regulations affect only the internal operation of particular branches of production or social activity, and the composition of their regulating councils should remain limited to people who participate in that

area. In others—areas like broadcasting or processes which may impinge upon public health—general social interests are affected. In these cases the regulating council would have to be extended to include a majority of other citizens, selected by lot to represent the public interest,

The other powers of demarchic councils would stem from their command over resources, human or inanimate. A council might be entrusted with the administration of certain immobile public property: buildings, historic monuments, transport routes, energy and water supply facilities. To the extent that these are immobile, the principal contradictions that may arise are over access. One thinks here of how the propertarian-dominated British commission responsible for ancient monuments denied the dispossessed access to Stonehenge. But to the extent that the property deteriorates and has to be maintained, even immobile properties presuppose an influx of labour and materials.

A council will also be entrusted with mobile public property in the form of machinery, vehicles and raw materials. This is more significant for demarchies administering manufacturing processes, but would affect them all to some extent. We assume that all such mobile property is ultimately allocated by the national plan. A council running a project has the use of the property unless and until a more urgent use arises.

Finally a council disposes of the labour of the members of its project. Since this labour is a fraction of society's total labour, and could potentially be devoted to other activities, it is, from the standpoint of the national accounts, abstract social labour. Similarly, the flow of mobile public property into the project presupposes a fraction of society's labour being devoted to the reproduction of these items. As a flow, therefore, it too is abstract social labour. The dynamic economic power of a council is, finally, command over social labour.

The magnitude of its power is measured in the hours of its labour budget. But by what right does it gain this power and who regulates its magnitude?

It is a power that is either devolved or in the last resort delegated by the people themselves. Consider a council administering a school. Its power might be devolved from some local or national educational council who vote it an annual labour budget. Let us assume that schooling is a local matter. In that case, the budget of the local education council would be set by the local electorate who would annually decide how many hours were to be deducted from their year's pay to fund education.

In the case of a manufacturing council, the delegation is more indirect. Its products—perhaps lead-acid storage batteries—meet an indirect social rather than concrete and local need. The number of batteries that society needs is a function of how many cars, telephone exchanges, portable radios, etc. are manufactured. Only the national, or in the long term federal, planning authority can calculate this. Thus only the planning authority can delegate a budget for battery production.

In all cases the people are the ultimate delegators of power. Either they vote to tax themselves and entrust a demarchic council with a budget to produce a free service, or they choose to purchase goods, in which case they are voting

labour time to the production of those goods.

The great virtue of the rule of the *demos* was the elaborate constitutional mechanism they evolved to defend their power against usurpation by the upper classes. That rule flourished for some two centuries until crushed by the Macedonian and Roman empires. During that period it generated a beacon of art, architecture, philosophy, science and culture that illuminated the subsequent dark centuries. The Enlightenment golden age of bourgeois culture was a self conscious reflection of that light. The torch will not truly be reignited till the modern *demos* come to power.

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