Scientific Management and the American Planning Experience
of WWI: The Case of the War Industries Board

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The art of war, however, as it is certainly the noblest of all arts, so in the progress of improvement it necessarily becomes one of the most complicated among them. The state of the mechanical, as well as some other arts, with which it is necessarily connected, determines the degree of perfection to which it is capable of being carried at any particular time. But in order to carry it to this degree of perfection it is necessary that it should become the sole or principal occupation of a particular class of citizens, and the division of labour (employments) is as necessary for the improvement of this as of every other art.

Adam Smith

Introduction

This paper examines the experience of war planning in the United States during the First World War, focusing on the particular case of the War Industries Board (WIB). It investigates why the US chose largely to abandon the price mechanism during the crisis and instead turned to conscious planning to allocate scarce war resources. The overriding aim of the paper is twofold: to examine the effects that such an experiment had on the thinking of business leaders and economists regarding the respective roles of plan and market under capitalism; and second, to identify the contribution of the scientific management movement to this attempt at planning. The paper builds on Wren’s (1987) positive treatment of Taylorist involvement in war planning and seeks to challenge the claims made by Stabile (1985), and more recently by Nelson (1992), that the Taylorists had little or no impact on the mobilisation effort.

The paper is divided into three parts. Part One examines the intellectual and philosophical milieu of the planning impulse, paying particular attention to the rise of Progressivism and the location of scientific management or Taylorism therein. Part Two focuses on the nature of the war crisis and the apparent failure of the market to accommodate such. To add greater depth to the work of the WIB and to the role of Taylorism in this experiment in planning, the paper will consider the contributions of two of the most significant leaders of the Taylorist movement, Morris L. Cooke and Henry Gantt. Part Three examines the consequences of this planning experience for American political economy, focusing respectively on its immediate impact on war production and on the thinking of economists, the postwar ‘return to normalcy’, and the subsequent resurrection of planning in Roosevelt’s ‘New Deal’.

During the First World War, the USA a country steeped in the tradition of individualism temporarily put this commitment on hold, and opted for planning and government involvement in economic affairs. The ideological and philosophical breeding ground for this shift was the so-called Progressive Era. The sentiment common to the Progressives was that of dissatisfaction with the belief that things would take care of themselves and that the same automaticism that had secured the past would also take care of the future. Most Progressive thinkers pointed to the need to replace the prevailing drifting sense of national destiny with a more conscious and intelligent sense of purpose: the efficacy of intelligence, rather than acquiescence, as the regulator of human relations. They believed that the nation-state, in conjunction with experts, would have to be the catalyst herein, taking more responsibility for socioeconomic conditions. The focus in this part of the paper will be on what Alchon (1985) terms "technocratic progressivism". This necessitates an examination of those liberals in or around scientific circles who made science-based claims to social authority and policymaking, rather than those in the political theory arena where usable or practical politics were noticeably absent.

Kaplan (1956, 347) asserts that "(m)ore intensely and systematically than ever before in the history of American thought, the gospel of intelligence as the key to social progress was preached by American liberalism during the first quarter of the twentieth century". The liberal appeal to intelligence rather than 'rule-of-thumb' or convention was very broad. More reformist than revolutionary in relation to property and profit, the liberal appeal was to "thoughtful men of all classes to act together as a vanguard for the building of the Good Community by the method of science" (Kaplan 1956, 347). One of the leading Progressive thinkers, Herbert Croly, maintains that the Progressive period was dominated by the idea that society's "better future would derive from the beneficial activities of expert social engineers who would bring to the service of social ideals all the technical resources which research could discover and ingenuity could devise" (cited in Kaplan 1956, 347-348).

Croly was the founder and editor-in-chief of the Progressive's intellectual sounding-board, the New Republic, and a strong advocate of scientific management. He believed that capitalism needed to be regenerated by the 'scientific humanitarianism of men of genius' (Kaplan 1954, 352; Haber 1964, 85-86). These so-called 'men of genius' Croly later redrew as an official class of experts within the state apparatus of progressive democracy. It is here that he establishes strong links with the scientific management movement. He draws comparisons between the functions of scientific management in industry and the functions of a general body of expert administrative staff in government to carry out policy (Kaplan 1954, 355). Central to this idea is the planning department. It was the means, according to Croly, of replacing amateurism with experts and substituting broad social purposes for selfish and hidebound goals. It was in the planning department that the educated administrator could impose technical standards for the general good (Haber 1964, 89). In fact, Haber maintains that "(s)cientific management, especially when placed within the conditions of industrial democracy, embodied in the factory the regime these progressive thinkers envisioned within society at large" (Haber 1964, 97-98).

Scientific management evolved within the systematic management movement of the late 19th century. The concerns of this movement centred on securing better managerial control over materials, labour, and the production process. Frederick Winslow Taylor's method of achieving this objective involved the empirical study of waste to be found in work processes and management procedure, the development of plans to eliminate this waste, and the implementation of such plans through administrative hierarchies. It involved the substitution of
technocratic direction for the traditional authority of skilled craftsmen, foremen, and rule of thumb supervisors, all in the interests of greater efficiency, increased output, and expanded income (Alchon 1985, 15).

The Taylorists were convinced that rule of thumb was not an acceptable basis for guiding the production and distribution of wealth. They insisted that the scientific method of investigation was fundamental to the scientific managers' methodology. As Person (1919, 10) asserts,

...scientific management characterizes that form of organization and procedure in purposive collective effort which rests on principles or laws derived by the process of scientific investigation and analysis, instead of on tradition or...trial and error.

They believed that management should analyse every phase or element of business securing all available data or stable and dependable facts upon which plans should be based for operations, all with the aim of increasing efficiency at optimum cost and operating conditions (Bruce and Nyland 1993, 2-3; Yerbury and Karlsson 1992, 312). Thus, the planning department was to be the repository of the science of production and "therefore to possess a new kind of authority which stemmed from the unveiling of scientific law rather than the expression of arbitrary will" (Haber 1964, 25).

Taylorism and the focal idea of planning were very much a part and product of the Progressive philosophy. In their espousal of the scientific method of investigation, the Taylorists believed they were providing society with planning techniques which could enable economic agents to gain greater control over the anarchic elements that dominated the production process, and thus enhance society's ability to direct and control its own development (Nyland 1987, 61). They believed that planning is the application of reason and foresight to the ordering of human affairs and the attainment of human purposes - concerted, collective action designed to consciously control the course of economic events so as to deny the automaticity and naturalness that humans accord the world around them - very much central beliefs of the Progressive philosophical platform.

Following Taylor's death, his disciples and admirers in and around the Taylor Society, developed and expanded on his conception of planning in the workplace (Alchon 1985; Nyland 1987; Bruce 1992; Pabon 1992; Bruce and Nyland 1993). Seeking to stabilise production they sought to apply Taylor's techniques to an ever wider arena: at an industry level, and eventually at the macroeconomic level to stabilise output and employment. They believed that this was very much in keeping with Taylor's view that scientific management was an evolutionary process rather than an invention, and that it was applicable to all human affairs. During the First World War in the USA, this notion was to become manifest in a planning system wherein the individual economic activities of atomised plants, enterprises and industries were limited or shaped into group-defined or coordinated spheres of action. This was all done to achieve the rationally conceived and socially comprehensible goals of utilising all available resources in the most efficient manner so as to achieve the maximum satisfaction of the needs of the people in a given interval of time (Lorwin, 1931, 774; Loucks 1932, 116).

2 Why and How Planning Arose: Market Failure, the WIB and its Precursors

Modern war is almost wholly a matter of industrial technique. It is an affair of office and factory. It has become a sordid affair of the machine process in which the real hero is likely to be an engineer or a physicist as a dashing general. The game is played on the farm and in the factory; the armies merely tally up the score.

Clarence Ayres
In this section, the paper attempts to shed some light on why and how planning arose in the war years, paying particular attention to how the ideas of business leaders and economists were shaped both by the ensuing crisis, and by the ideological responses to such. By way of beginning, it should be noted that in the prewar period, despite the 'efficiency craze' aroused in and around Taylor's publication of _The Principles of Scientific Management_ in 1911, and the obvious dissatisfaction of Progressive thinkers with the status quo, a large part of the movement for socioeconomic reform found little foothold in official policy circles. Scientific management was isolated to a few hundred businesses and in fact, as Stabile (1985) documents, Taylorism had enjoyed only moderate success because of the hostility and resistance it invoked in workers and their organisations.

There were exceptions to this scenario however, and a brief mention of pre-war Taylorist involvement in public affairs is warranted in order to convey a more accurate picture of their impact on thought and policy. In fact, pioneering work conducted by Schachter (1989) examining the influence of scientific management on public administration scholarship, suggests that pre-war scholars in this discipline were intrigued with scientific management because it held "the promise of renewing the democratic nature of city agencies' relations with their constituencies" (Schachter 1989, 111). It was believed that adapting Taylorist methodologies to city bureaucracies would increase their responsiveness and accountability. One such attempt materialised in the New York Bureau of Municipal Research. Staffed largely by Taylorists, the Bureau represented "the first attempt to deliberately organize and compare techniques for accomplishing municipal work to help agencies perform tasks expeditiously and give citizens the data needed to maintain control over government" (Schachter 1989, 91). One of the directors of the Board, Frederick Cleveland, had close ties to F.W. Taylor and Morris Cooke, serving with them on the National Bureau of Utilities Research. Cleveland was also appointed chairman of President Taft's 1911 National Commission on Economy and Efficiency. Such developments, despite brief mention, illustrate the breadth and importance of scientific management for pre-war public affairs.

The onset of the war plummeted such individuals to the centre stage of policy-making and acted as a tremendous stimulant to the expansion and promotion of the ideas of scientific management. The need to fuel the fires of America's war machine and maximise production brought such technical experts into greater prominence. The US had to match the German tradition of a strong liaison between science, industry and the state that had aided the latter's war industry and military preparedness. As a consequence, the wartime government recruited engineers, professional economists and a large part of the scientific management movement to assist in efforts to boost production, minimise waste and utilise labour efficiently. It would be here that the economists' and business leaders' conceptions of plan and market were most affected.

The nation's turning to the technicians was a consequence of the failure of the market to produce the needs of war effectively. The pressures that resulted in market failure, and hence the need for organisational and economic change, emanated from two sources. First, the need to dramatically expand the stream of war produce to the Allies in the form of new credits, more ships and war materials, and increased foodstuffs. And second, the decision to raise a large expeditionary force to be deployed in France. The advent of "total war" in Europe led America to realise the inadequacy of her defence measures. But more importantly,

the realization also came that preparedness involves more than mere appropriations - it takes time, and men, and materials, and industrial plants, and above all, coordination...the spotlight focuses on our industrial system as perhaps the most important single factor in defense (Kester 1940, 655).

And further, as Hawley (1992, 16-17) notes,
(1)he consequences...were to subject the economy to massive demands for a new type
of consumption, and from the outset it was widely conceded that trying to meet these
demands through existing economic and political institutions was likely to bring
economic chaos and social breakdown. Temporarily, at least, America would have to
construct its own version of the war collectivism to which the Europeans had turned.

At the beginning of US participation in the war, industry was in a state of confusion
which created enormous problems for the Wilson administration. Not only did the nation have
to organise and supply an army of its own, it also had to supply Allies desperate for war
materials whilst also meeting the continuing needs of American civilians. If these were not
complications enough, the separate branches of the US forces competed for supplies among
themselves, each bidding independently in the open market. Within the army alone there were
ten different procurement agencies, ranging from the quartermasters, engineers, and ordnance
through to the medical and signal corps. At the same time, government contractors were
competing among themselves for fuel and raw materials and the normal competition among
producers for markets had practically disappeared. This multiplication of demand resulted in
escalating prices, shortages of materials, duplication of effort, wastage of resources, and
general chaos (Kester 1940, 661; Wynn 1986, 67).

These market conditions were aggravated by a haphazard placement of orders and lack
of coordination in buying which resulted in congestion in some manufacturing areas and
underutilisation in others. The heavy flow of fuel and raw materials on the railroads also
impeded production, as the transport of productive inputs across the country slowed to a
grinding shuffle. Likewise the filling of orders was unbalanced and uncoordinated so that one
department might succeed in overstocking itself, whilst others could not secure necessities.

The demands placed on supplies pushed prices up. This situation is normally, at least in
theory, self-correcting as demand should drop off after a certain point as prices rise. But war
demand is very insensitive to price as the government has to have supplies regardless of cost.
The result was that prices quickly lost all relation to either cost of production or shortage and
so failed to adjust and clear the market of excess demand. On the supply side, the complete
'shock' of US participation in the war, coupled with the lack of coordination and information
regarding what and how much war materials were needed, meant that the supply response was
very slow in coming. Producers of civilian goods too, suddenly had extraordinary demands
placed upon them to alter their production process and shift their production towards military
supplies. The supply of productive factors, including labour, and their eventual uses,
underwent a dramatic transition in a very short period, as aggregate production was suddenly
gear ed towards satisfying a new type of demand. This further thwarted the market adjustment
process that is a major strength in the efficacy of the free market (Kester 1940, 662-663).

When the working of demand and supply failed to provide the types and numbers of
goods and services desired by society, the attitude of business and professional economists
towards the efficacy of the free market underwent a great transition. It began to be accepted by
the same that there was need for government intervention to correct such failure. In other
words, these parties began to accept that there was a need to find a new mechanism which
could supplement the market and reduce competition for scarce materials and bring production
into line with demands. The mere placing of orders through competitive bidding and the
interplay of demand and supply via the price mechanism could not be relied on to bring this
about. Initially, this ideological swing by business and economists away from the market took
the guise of detentes involving voluntary cooperation between public agencies and enlightened
private bodies. It is such notions as these that underpinned what J. M. Clark (1917) termed
'war-time collectivism' and elsewhere described as the swing "away from narrow individualism
toward a sense of solidarity and social mindedness" (Clark 1916, 210). Unfettered
individualism would have to give way, at least until the resolution of the conflict, to
government involvement with the private sector in planning out the demands and supplies relevant to a war economy.

The result of this ideological swing was a litany of public-private planning agencies entrusted with the task of matching war supplies and war demands. For instance, through the WIB the government determined industrial production, selecting industries and products which were considered essential and giving them preference in the use of raw materials, labour, capital, and transportation. Through the War Food Administration, it sought to control the production and consumption of food, largely via the efforts of Herbert Hoover, who was later to become the most prominent advocate of Taylorism in the 1920s. Through the Capital Issues Committee, it tried to regulate private investment. The Government also took over the railroads and the telephone and telegraph systems.

With war planning went the Progressives' hope for a better world. The Progressives believed the war would reveal the use of technology for communal purposes, the value of subordination of production for profit to production for use, and the organisation of the means of production for public control. This would yield greater control for economic agents over the anarchy of the free market. The US might not ever be the same as a result of this unprecedented government intervention, some believing that war planning dealt the sacredness of property a blow from which it would never recover (Schlesinger 1957, 40-41).

Before US entry in the war, the immense pressure of demand from both the Allies and the US Government influenced the thinking of business, economists and public officials to such an extent that they rallied to create some order in the nation's economy. As early as 1915, President Wilson aimed to build a navy "second to none" whilst a civilian Naval Consulting Board, picked from scientific societies, was established. Financed by private contributions it compiled an inventory of manufacturing plants capable of making munitions. In 1916 Congress passed a National Defence Bill giving the President power to order war materials, to commandeering manufacturing plants and to appoint an industrial mobilisation board. This eventually resulted in the formation of the Council of National Defence (CND). However it was not until after three months of US involvement in the war that the WIB came into being, and another eight months until the WIB gained executive power. Before this time confusion reigned, as the various bureaus in the War and Navy Departments, the Emergency Fleet corporation, and other government agencies tried to estimate their several needs and find the sources to supply them (Soule 1967, 41).

In short, the WIB grew out of the difficulties facing the state in getting the required cooperation from the private sector. The CND was based on voluntary cooperation and so had no legal status, while at the same time it had little central coordination and hence suffered from overlapping and often contradictory aims. It is necessary to consider the latter body briefly, as most of its organisational planning apparatus and personnel were simply transferred to the WIB. Further, considering the shortcomings of this body sheds important light on why the WIB had arguably greater success in achieving its objectives.

As already indicated, industrial preparedness for the war can be traced back to 1915, and to the thinking of two principal figures with independent but parallel ideas: Howard Coffin, president of the Society of Automotive Engineers, standardisation enthusiast, and chairman of the Industrial Preparedness Committee of the Naval Consulting Board; and Hollis Godfrey, president of the 'scientifically managed' Drexel Institute of Philadelphia. Both of these figures were later members of the CND. Coffin argued that once America entered the war, 80% of her manufacturing capacity would be devoted to military production, and this being the case, the wholesale transformation of the economy had to be carefully planned. Coffin considered engineers to be the most competent experts to oversee the planning of industry during war. Given the difficulties in filling Allied munitions orders during peacetime, what was necessary, he argued, was some kind of education and tooling up process and a general application of the
concept of standardisation to avoid chaos and stabilise the economic system. Coffin was chiefly responsible for making the formentioned inventory of the country's manufacturing plants, and collecting data bearing on their war service capabilities for the Naval Consulting Board (Stabile 1985, 82; Cuff 1973, 22; Clarkson 1923, 13-14).

Likewise, Hollis Godfrey concluded that military success lay ultimately in the mobilisation of the nation's economic resources. He was part of a small band of scientific management enthusiasts who had gathered around F. W. Taylor and had begun applying the scientific method to the management of American economic and political life. He believed that the same principals that applied in the shop - getting the product and service at a minimum of cost and time - should be applied at a national level via a council of efficiency experts. His experience in Europe, especially his exposure in Britain to discussions of the need for a Council of Imperial Defence, gave him the answers that he believed were needed in America (Cuff 1973, 27-29).

Coffin and Godfrey eventually came together in the CND in late 1916, the purpose of which, as stated by President Wilson, was

...for the creation of relations which will render possible in times of need the immediate concentration and utilization of the resources of the Nation...and opens up a new and direct channel of communication and cooperation between business and scientific men and all departments of Government...the whole industrial mechanism must be organized in the most effective way (cited in Clarkson 1923, 21).

At the heart of the CND's experiment in war planning were the cooperative committees of industry who were required to funnel information on prices and capacity to the Advisory Commission of the Council and receive in return government specifications and requirements. These committees were the backbone of the later trade association movement fostered by Herbert Hoover. Other notable members of the Commission were Bernard Baruch, later Chairman of the WIB, and Samuel Gompers, president of the AFL. The Commission stood between government and industry, exercising ultimate control over the system of supply in an attempt to break any bottlenecks in the flow of goods. It was a voluntary system of business-government relations, "founded on the rock of corporate capitalism and a loose coalition of like-minded men, it was equally removed from either the social model of laissez-faire or the left wing goal of state control" (Cuff 1973, 69; 71).

The whole committee network depended so much on voluntarism that the man at the helm, Baruch, could compel neither businessmen nor the military services to cooperate with him. Likewise all the committees, the raw materials committee, supplies committee, the Advisory Commission, the General Munitions Board, and the military bureaus, all claimed a directional authority in the mobilisation program which further added to the unstable, uncertain and fractionalised nature of the early committee system. As Cuff (1973, 73) puts it,

no single agency could commit the government to systematic policies in prices, precedence of orders, antitrust action, or general overall requirements. Many of the agreements won by committee chairmen, then, were merely the best defensive tactic available in a chaotic administrative environment.

The reaction among committee men to the rather muddled and sluggish mobilisation procedures held significant implications for the evolution of war planning in the guise of the WIB. These business volunteers were placed in the vanguard of those Washington advisers moaning the creation of an authority with central control and direction over the mobilisation process that was needed, they believed, to correct market failure. As Cuff (1973, 82) asserts,

(c)ommittee chairmen wanted to substitute uncoordinated efforts with a continuous plan, and fragmented authority with concentrated power. More aware than most Americans and most government officials of the economic chaos and disorganization which the country had to surmount before it could efficiently meet the demands of the
modern war, business volunteers were moving to modify drastically the principles of laissez-faire.

Or as Fearon (1987, 12) states,

before America's war began, businessmen who were supporters of the trade association movement and those who had been plucked from the desks of large corporations had moved into very influential positions. These were individuals to whom unfettered competition was abhorrent; when the government became the largest single employer of labour their ascendancy was already assured. Indeed the war abolished competition.

These business leaders lobbied for the creation of greater governmental power so as to provide private arrangements with the sanction of public law. It was accepted by government, business and labour that if the spirit of voluntary cooperation was to thrive at all, it required support from centralised decision-making administered through a coordinating public agency. This came in the form of the WIB in July 1917 (Cuff 1973, 83; 86).

The WIB was a clear recognition of the wide belief that voluntarism, and indeed the market, had failed and therefore of the resultant demand by economists and managers for a more effective coordinating and policy-making body. President Wilson gave the WIB a specific executive mandate to coordinate war industry, calling upon the Board to act as a clearing-house for the war-industry needs of the Government, determine the best ways of meeting them, and the best means and methods of increasing production, including the creation or extension of industries demanded by the emergency, (and) the sequence and relative urgency of the needs of the different Government services...

(cited in Clarkson 1923, 37).

In a 1918 letter, the President delegated his own authority to Baruch insofar as it extended to the supervision of the industrial needs of the departments and "place(d) him definitely at the head of them as the planning leader" (Hitchcock 1918, 563).

To meet the ends of war, central direction of the economy was necessary and war itself, by creating clear and definite priorities, supplied the criteria to make rational organisation of industry possible. Through the WIB the government mobilised industrial production. As Hitchcock (1918, 545) puts it,

(a)fter a year of war the direction of industrial policy is placed in single hands, and a central planning board is established for dealing not only with the problems of production and purchase but with the whole attitude of the government toward the mobilization of business resources for the prosecution of the war.

Schlesinger (1957, 40) maintains that the WIB "was the central experiment in economic planning, whilst Hitchcock (1918, 566) asserts that the WIB "is a notable demonstration of the power of war to force concert of effort and collective planning, with centralized responsibility." Likewise, Leuchtenburg (1990, 85) asserts that "World War I marked a bold new departure. It occasioned the abandonment of laissez faire precepts and raised the federal government to director, even dictator, of the economy". These developments would have noteworthy influence on the thinking of economists regarding the place of planning and the efficacy of the market, as will be seen further in Part Three.

The work of the WIB fell into 12 well-defined functional parts or implements of utilisation of various powers and discharge of its duties. These were Priorities, the Clearance Office, the Conservation Division, the Resources and Conversion Section, the Industrial Inventory Section, Facilities Division, the Advisory Committee on Plants and Munitions, the Labor Division, the Technical and Consulting Section, the Purchasing Commission for the Allies, Division of Planning and Statistics and Price-Fixing. The WIB thus became the central control of finance, internal commerce, foreign commerce, domestic industry, shipping railways, fuel and food. The WIB knew currently all that could be known of war demand and all that was humanly possible to gather concerning the resources and facilities with which to meet it
(Clarkson 1923, 63). This was the real basis of the WIB's power: the detailed knowledge it accumulated concerning the amount and locations of various supplies that could be obtained, and of the demands being made upon them. At last America had approximated the German model of commerce and industry organised and directed to function as part of the fighting nation.

Yet private ownership of the means of production still remained as a sacred ideal - it was just that production was geared to public rather than private ends. The WIB was an alternative to free, competitive markets, substituting national needs for the customary sale to the highest bidder. It is important to stress this so that the exact nature of the planning undertaken can be understood.

Planning Functions of the WIB

Planning in the WIB fell under five major functions: coordination of demand and supply; administration of priorities; price-fixing; conservation and conversion; and controlling labour. The structure of the planning agencies utilised in the WIB were very similar to those in the CND. The old cooperative committees of industry were replaced by commodity sections, the new representatives of industry. Nearly 500 of these sections were created, all aligned for the purpose of producing for the government or offering their trades to be sacrificed in the interests of conservation (Paxson 1920, 68). President Wilson observed that the WIB was to be in the centre and "anticipate the prospective needs of the several supply departments of the Government and their feasible adjustment to the industry of the country as far in advance as possible, in order that as definite an outlook and opportunity for planning as possible may be afforded the businessmen of this country" (cited in Cuff 1973, 162). The commodity sections grasped the true idea of control of industry - the compacting of knowledge and direction of all things pertaining to a given commodity into the hands of practical specialists, who were to operate via the existing business mechanism instead of through the artificial new administrative machine. Businessmen wholly committed to government service, but knowledgeable of the problems of industry, now faced men wholly representative of industry but sympathetic with the purpose of government (Clarkson 1923, 301-303). This truly was a unique form of capitalist planning, the actual mechanics of which will become clearer in the following, where the planning functions will be examined in more depth.

A. Balancing Demand and Supply

Given the aforementioned failure of the free working of demand and supply to clear the market and match the war demands, the balancing of demand and supply was one of the primary planning steps taken by the WIB. The problem of competition between Allied buying and that of the US government was improved by the coordinating efforts of the Allied Purchasing Commission. No orders and no purchases were to be made by the Allies except through this body. Likewise, the problem of private suppliers in planning their production horizons in the midst of needs being disclosed only by the actual placing of orders, was attended to by the Requirements Division. Each government department and the Allied Purchasing Commission submitted a statement of its estimated requirements projected as far into the future as possible, these estimates being considered daily at meetings of the Division. The Division then sent the estimates on to the commodity sections that were in touch with the various fields concerned, and the sections reported back to the buying departments as to the possibilities and best methods of meeting the requirements. These Division meetings gave the WIB a view of the whole field of operations and the buyers a knowledge of one another's needs and where their respective efforts conflicted or overlapped. This effectively meant that all military buying and selling was coordinated, cut-throat competition was removed, and the
pressures on price and supplies were largely moderated (Clarkson 1923, 123; Kester 1940, 663-664; Cuff 1973, 162-163).

These efforts to balance supply and demand were undoubtedly assisted by the Division of Planning and Statistics, headed and staffed by leading advocates of scientific management including Edwin Gay, Henry Dennison, Leo Wolman and Wesley Mitchell, whom Alchon (1985, 27) terms "the technocratic point men of the reorganized war effort". Their division was the central composer of all the statistical research being carried out by all the commodity sections and divisions of the Board. Previously part of the Shipping Board, this division collected information on the army's requirements, the volume of ship space consumed by non-essential imports, and the nature of available ships. It made studies of war-time price movements, war contracts and deliveries, and the supply programme; provided helpful information from the industrial experience of allies and enemies; and promoted the collection of statistics throughout the nation. It was the peak statistical division of mobilisation and the agency responsible for giving the President a concise picture of the whole economy. This meant that military buying and selling was undertaken with more complete information regarding prices, requirements, and location of commodities (Clarkson 1923, 200-202; Dorfman 1949, 477; Alchon 1985, 29).

B. Priorities

The first efforts under the priorities committee had been purely advisory, but after the President specifically conferred on Chairman Baruch the control of priorities in production and delivery, the system required that every buyer obtain a priority certificate rating their order as to urgency, and every industry was classified according to the preference it would receive in apportioning fuel, power, transportation and labour. In other words the WIB could give definite rulings on the order in which demands might be supplied such that those with the largest purse could not necessarily obtain the materials first. In this way, the problem of abnormal demands in affecting prices began to diminish (Baruch 1921, 47). The guiding principle of priority therefore, was the degree to which filling the order or manufacturing the goods aided the conduct of the war.

This was all possible because of planning - the immense assemblage of all facts about materials about which the commodity sections dealt. This included sources of materials, processes of preparation and manufacture, names, locations and capacities of plants, railway and other facilities, and costs of manufacture. "Thus", Clarkson (1923, 308) notes, "at one definite place all of an industry - the producer - and all of Government - the consumer - could meet and dispose of every situation so far as the bringing together of requirements and supplies could do it". No more did Government agencies direct orders toward sources of goods, the commodity sections measured out the nation's resources not on the basis of first come, first served to the limit of demand, but in neat allocations according to the standard of priority. As Clarkson (1923, 309) notes, "(t)he War Industries Board stood for coordination among the war-making agencies, and it practiced its own preaching at home. In the end it placed superbly coordinated industry at the service of coordinated consumption. Thanks, of course, to priority, but the commodity sections were the alpha and omega of priority".

The most significant effect of the priorities system was a balanced program of manufacturing which avoided over-production of one material at the expense of another of equal importance. This was done by determining the relative importance of all the industries and plants and of all orders for goods. The priorities system also had a significant role in keeping prices down since the effect of abnormal demands was lessened when the government decreed which demands should be satisfied (Kester 1940, 666). Price stabilisation was achieved "by establishing an orderly sequence of the satisfaction of demand and insuring supplies to the holders of Government contracts" (Clarkson 1923, 156). Normally profiteers
would have made fortunes in this sellers' market as preference is in the hands of the seller and so the purchaser pays them for priority, priority going to the highest bidder. But under the priorities system, goods were apportioned out according to a rationing system rather than ability to pay. With supply carefully coordinated with demand, the upward pressure on prices and the ability of profiteers to make windfall gains was effectively undermined.

C. Price-Fixing

A third planning function of the WIB was that of price-fixing. Bearing in mind that he was a former member of the CND, Grosvenor Clarkson (1923, 157) stresses that "competitive bidding under war conditions with the Government as an urgent buyer of all that can be produced would have been a mockery and with such a continuous confusion of production and stimulation of prices as can hardly be conceived." What was believed was necessary, therefore, was a combination of priority and price-fixing, a visible hand of planning, to accommodate for the fact that the normal forces of supply and demand had been dislocated and that the government would not pay exorbitant prices and then recoup itself with excess profits taxes or selling bonds. Some method of keeping prices down was needed. Remember that under normal conditions, the increasing supply that follows a price rise tends to actually retard the rise, but the demand for war-goods was always greater than the maximum possible production and an increase in production of one was always at the risk of producing a new shortage in the supply of another war good. As Bernard Baruch (1921, 76), chairman of the Price Fixing Division asserts,

(w)hen a demand in the nature of war demand - absolute and unabated by considerations of a return in value - enters the field, there is no force tending naturally to adjust the market value to cost of production. Hence it was found necessary to...measure just compensation by its primary cause, cost of production, including a reasonable profit.

Much has been written in the economics literature on price-fixing in this period (Anderson 1918, Taussig 1919, Warren 1919). It should be emphasised that this marked the first experiment in the US of direct government control of prices of commodities. As suggested earlier, since the US was steeped in individualism and the 'frontier' mentality, only a crisis could have necessitated such measures. By late 1917, prices were soaring out of all proportion to the cost of production and were fluctuating with even greater uncertainty. Price-fixing by the WIB was an attempt to stabilise prices, and to overcome speculation and manipulation by middle-men. The actual form the price-fixing process took was a series of agreements between the Price Fixing Division of the WIB and the national representatives of various branches of industry as regards the price to be paid for their products. Basically, the basis for determining prices was to be the cost of production plus a reasonable profit, but a troublesome question at the outset was whether this price should be flexible, varying with the production cost of each plant, or a flat rate for the entire industry. The latter was chosen and the imperative of expanding production, and the need to keep the enthusiastic support of business, induced the fixing of a price high enough to give substantial profit to marginal producers. The more efficient had their excess profits taxed to keep the margin down (Kester 1940, 672-673). The justification for focusing attention on the marginal producer was to maintain much needed output.

While negotiated through collective bargaining, these agreements had all the force of a price-fixing law, and they illustrate perhaps better than any other activity of the Board its tendency to become a central, executive, industrial planning board (Hitchcock 1918, 559). In most cases, these changes and restrictions were carried out with the agreement of the manufacturers following negotiation. However, the WIB did have powers to enforce decisions and if necessary, fix prices unilaterally. Though the system worked through voluntary
cooperation, the threat of commandeering gave force to the cooperative impulse. In two cases the WIB threatened to use force; first when Henry Ford refused to limit private car production, and second, when Elbert Gary of US Steel refused to accept the government's price of steel. In both cases, Baruch warned that he would instruct the military to take over the plants. The industrialists both backed down. These cases clearly demonstrated that the WIB had authority and was prepared to use it (Wynn 1986, 75).

D. Conservation and Conversion

A fourth planning function of the WIB was the eradication of waste via conservation, and the conversion of civilian, to military, production. The aim of the Conservation Division was, according to the President, "the conservation of resources and facilities by means of scientific, industrial, and commercial economies" (cited in Baruch 1921, 61). That is, to eliminate wasteful trade practices and to release manpower, materials, manufacturing facilities and capital by reducing the number of different types, patterns and styles of articles manufactured, and by requiring the substitution of more plentiful for less plentiful materials (Baruch 1921, 63). Savings were enjoyed largely in civilian sectors, thereby freeing up resources for war industry - 1,241 savings were effected (Clarkson 1923, 216-224). Once again, the Conservation Division was staffed mainly by Taylorists and was to be the embryonic form of Hoover's later Waste In Industry program. Hoyt argues that to realise these economies during the war, the combination of industries into an effective unit was essential, as the "adoption of any plan for standardization presumes a uniform practice in the whole industry" (Hoyt 1919, 99-100).

Likewise, the Resources and Conversion Section stimulated the conversion of industrial plants from non-essential manufacture to the filling of military needs (Kester 1940, 669-670; Paxson 1920, 72). This meant that the production of non-essential items was curbed, thereby freeing up scarce resources for military use. In this way the WIB affected the allocation of resources and their subsequent use. No longer did resource owners freely offer their resources for sale according to profitability in different industries. Now they did so according to the public-interest dictates of the planning apparatus, the WIB.

E. Control of Labour

The WIB from its very beginning had a member in the Labour Division charged with consideration of labour problems. This was Hugh Frayne, who carried on the work of Samuel Gompers (one-time president of the AFL) in the CND. More important, however, was the War Labor Board, chaired by ex AFL president W.H. Taft and former chairman of the Industrial Relations Commission, F.P. Walsh, and whose purpose was "to promote and carry on mediation and adjustment in the field of production necessary for the effective conduct of the war" (Wehle 1919, 326-327). This board, in conjunction with the Labor Division of the WIB, sought to harmonise employers and employees in their relations. To achieve this objective, both of these bodies sought to standardise wages by taking them out of the realm of disputation, which was analogous to the price-fixing of commodities. Working conditions were also to be standardised in both the employment agencies of the government and private industries working on government orders. The War Labor Board also supported the right of workers to organise and to establish shop committees (Clarkson 1923, 289; Wehle 1919, 329).

In general terms, the labour problem was perceived as being the search for a means of guiding labour into essential industries and the prevention of wasteful labour turnover. Important to the WIB in this regard was the US Employment Service which acted as a national labour employment medium and was intended to control the whole supply of labour so as to reduce labour turnover and give the WIB the means of applying the principle of priority to labour. It also carried out surveys of the common labour requirements of the war industries
and of the reserves of labour in each state (Clarkson 1923, 289). As Wehle (1919, 341) sums up the functions of the Employment Service,

The principle objects behind this plan were first that the needs of the great war industries for common labour should be met by drawing to a considerable extent upon the less essential and non-essential industries, and second that through a central machinery, run without the motive of private interest, placements of men could be made with sufficient care to fitness to cut down the mounting index of labor turnover. What this meant was that the WIB, already supreme in materials, finance and transportation, now became the allocator of men, not only between industries, but between military and civil life. "It was (sic) become the virtual general staff of the civil life of the country as applied to war ends. All America in all its material and human resources was subject to its command" (Baruch 1921, 292). The whole process was termed "industrial conscription" by H.G. Moulton (1917).

The Role of the Taylor Society and the Taylorists in the WIB

Given the philosophy of scientific management and its achievements in advancing production via planning at a microeconomic level (Farquar 1919; Person 1919), it is not surprising that the Wilson war administration sought the services of many of the leading Taylorist efficiency experts. The broad focus here is on the role played by these Taylorists in the WIB, and more specifically on the role of two of the recognised leaders of the Taylorist movement, Morris L. Cooke and Henry Gantt.

All of the officers and a large part of the membership of the Taylor Society went to work for "Uncle Sam" (Haber 1964, 121; Nelson 1992, 15). This is confirmed by a Note in the opening issue of the 1919 volume of the Bulletin of the Taylor Society, the official publication of the Society:

The influence of war conditions on the affair of the Society, especially the absorption of all the officers and the greater part of the membership into war organisations, made it expedient to suspend publication...No Bulletins will be issued as of the year 1918.

H.S. Person (1919, 1), President of the Society, estimated that 70% of the Society were directly and indirectly engaged in 'war work' and it is for these reasons that "during the past two years the Society has not been active." Industrial efficiency, especially in the armaments industry, was an urgent matter. Taylor's advocacy of unrestrained production now became more relevant than ever. In the WIB for instance, there was the Conservation Division, staffed in part by leading Taylorists and charged with eradicating unnecessary uses of labour, materials and capital. This organisation had a very important bearing on later events, notably on the industrial standardisation and waste eradication efforts led by Herbert Hoover. The Taylorists appeared in largest numbers in the Division of Planning and Statistics, which was alluded to earlier in this section of the paper. Others found themselves in the Ordnance Department, where scientific management had already gained a foothold after the battle to 'Taylorise' the arsenals, and in the Shipping Board and Emergency Fleet Corporation (Haber 1964: 120-121; Clarkson 1923, 501-507).

Given the numbers of Taylorists in the WIB and other planning bodies, it is difficult to accept the claims of Stabile (1985, 95) and Nelson (1992, 15) that the Taylorists had little or no impact on US mobilisation policy. The key to their portrayal of Taylorists as having only a minor role in war planning rests with their limited conception of what scientific management was about. In Nelson's case, he does not see planning as the key element in Taylorism and so he misses the fundamental link between enterprise and war planning. Stabile on the other hand, mistakenly conceives of Taylorists only as engineers with a progressive bent, such that he places inadequate emphasis on the important role of those supporters of Taylorism in the ranks of management, economics, law, and even social work, in war planning.
The activities of Morris L. Cooke can be used to illustrate the role of the Taylorists in the war planning effort. Cooke was one of the few disciples entrusted by Taylor to actually promote and implement scientific management. He became known for his applications of Taylorism to public administration and education and for his overtures to union leaders. He was later instrumental in Roosevelt's NRA, notably as Chief Engineer in the Tennessee Valley Project. Nelson (1992, 10) asserts that "Cooke was the most political of Taylor's followers, the principal link between scientific management and progressive reform." Given this bond between Cooke and Progressivism, it is enlightening to examine his wartime role.

Cooke played a vital part in the prewar preparedness campaign discussed above, particularly in the army, where he directed his attention to storage of manufactured items until such time as they could be utilised, and also in the shipbuilding campaign. Cooke discovered that while plans had been made to produce munitions in great abundance, no provisions had been made for their efficient storage. In conjunction with Secretary of War, Newton Baker, Secretary of the CND, Walter Gifford, and Louis Brandeis, Cooke and his fellow technicians initiated an active campaign to have the storage factor recognised. These efforts came to fruition in the form of the Storage Committee of the CND with Cooke as Chairman. Among the early actions taken were the appointment of a Port Facilities Committee; the organisation of a management section to study the storage problem as it related to the manufacturers and the railroads, with special attention to be paid to the scarcity of shipping; and the appointment of a group to work on the training of men to supervise storage areas and buildings. Cooke's job called for manufacturers and railroads to work together, because the peacetime luxury of half-car shipments or half train-load lots was at an end (Trombley 1954, 71-72).

Cooke's attention to the packaging of military goods so as to economise space filtered through Taylorist circles, as two articles evidence in the Bulletin of the Taylor Society in 1917 and 1919, reprinted by permission of the Storage Committee. The concern of the 1917 paper was to outline storage techniques for war goods that would result in "decreasing the cost of handling stores, in increasing the rapidity of their inspection and the accuracy of their control, and in reducing spoilage due to careless methods" (Shelton 1917, 11). The 1919 paper, by the same author, outlined techniques to "aid more economical and effective use of storage space, and to insure the possibility of finding without delay any item known to be on hand." The means to such would be "good marking of storage spaces, making it possible to tell instantly where a given item of stores is", which in turn "depends on good layout" or planning (Shelton 1919, 21).

Before long however, Cooke and his associates discovered that even if the Storage Committee did function properly, it would only be as good as one cylinder in an otherwise hopelessly outdated engine. The wasted effort and confusion that characterised the non-combatant constituents of the army - engineers, signal, medical, ordinance, and ordinance, alluded to above as one of the raison d'etre's of the CND and WIB - thwarted Cooke's push for war industry efficiency. A major overhaul in the 'army industry' was needed and was initiated by Newton Baker on Cooke's recommendation, with the replacement of the chiefs of both Ordnance and Quartermaster General, who were viewed as being incompetent. Cooke went on to develop a complex reorganisation plan that would function under a Director of Storage and Traffic. General George Goethals was appointed to this role to maintain "control of the transportation of all branches of the army, both by land and sea, and all storage facilities herewith....". The duties of Storage and Traffic were to be "all movements of troops, as well as of munitions and of supplies of every kind...all inland traffic, embarkation service and overseas service relating to the army program...all storage for munitions and all other supplies of the army" (cited in Trombley 1954, 74-77).

Having taken care of storage and traffic, Cooke then turned to another problem facing the army - the fact that purchasing was being carried on at a number of places, as mentioned
above, and therefore the need to centralise such purchases. So eventually Goethals' title was changed to Director of Storage, Traffic and Purchases, so that now all the major functions were lodged in a new body. Under Goethals, purchases were handled by General Hugh Johnson, who later won fame as head of Roosevelt's NRA (Trombley 1954, 79).

With things seemingly well under control in the storage, traffic and purchases of the army goods, Cooke turned his attention to shipbuilding. After discussions with Charles Piez, vice-president of the Emergency Fleet Corporation and a Taylorist (having implemented scientific management in his company), Cooke took on the overwhelming shipbuilding job. The magnitude of this task is evidenced by the fact that manufacturing work more than three times greater than US Steel was contemplated and operating work more than twice that currently done by Pennsylvania Railroad was expected. Further, when the US entered the war there were only 50,000 people skilled in the construction of ships, yet when Cooke addressed the problem, more than 300,000 were expected to be employed. How did Cooke address the herculean task of assembling workers formerly employed in other trades and training them to construct ships? He saw the thing as strictly a planning and organisational problem and thus employed scientific management.

On Cooke's suggestion, the Emergency Fleet Corporation formed a Production Engineering Division, with Cooke at the helm, to handle "all matters connected with the general subject of production engineering". Trombley (1954, 83), Cooke's biographer, asserts that

(i)n effect, what Cooke wanted was an 'efficiency' organization; he wanted to take the 'plant' and do with it what he and Taylor had done with many other plants - get it managed scientifically. His division would judge standards; learn faster and better ways of doing thousands if individual operations...; be a 'watch-dog' to diagnose and remedy instances of slow production; title specialists and assign them...; and look into labor relations... .

Slowly but surely the task of building ships of steel, cement, and wood began to move forward and record production levels were recorded. For instance, in 1918, 123 ships were built which was greater than any previous year (Trombley 1954, 83-84). Above all, Cooke's key role in both storage and shipbuilding is ample evidence that the Taylorist movement were intrinsically important to the war planning effort, contrary to the views espoused by Nelson (1992) and Stable (1985).

Turning now to the role of Henry Gantt, he too is regarded as one of Taylor's inner circle, having worked with him at Midvale and Bethlehem Steel companies. Like Cooke, Gantt played a major part in pre-war preparedness activities. In 1911, with another notable engineer and Taylorist, Harrington Emerson, Gantt was commissioned to study the organisation and management of the Navy shipyards. He also served as a consultant to General William Crozier at the Frankford Arsenal just prior to the war. Crozier, influenced by Gantt's use of graphic displays, developed a series of "progress and performance" charts to aid the management of the Ordnance Arsenals (Wren 1987, 136-137).

But Gantt's major breakthrough in charting came when he served as a consultant to the Army Department during the war. Gantt was assigned to the task of coordinating the work of production not only in the Government arsenals, but in all privately owned plants working on ordnance material. When Gantt gave up his lucrative consulting work to aid the war effort, he puzzled over the problem of keeping track of the vast work of the various departments. Scheduling was especially crucial and management lacked the necessary information to coordinate private contractor's efforts with those of the government producers. Gantt spent several months pondering the problem before the thought came to him that "(w)e have all been wrong in scheduling on a basis of quantities; the essential element in the situation is time, and this should be the basis in laying out any program" (cited in Alford 1934, 207). Gantt's solution
was a bar or Gantt Chart for planning and controlling work, the essence being to show how work was routed and scheduled through various operations to its completion. By charting the progress of production it enabled those in charge to have a comprehensive, detailed picture not only of what was available and what had been accomplished, but also what had to be done in order to deliver complete products (Alford 1934, 192-195).

Gantt then went to work for the Emergency Fleet Corporation, at the time when Germany was paralysing Allied shipping and so winning the war. It was feared that by the end of 1917 Britain might have to surrender because of lack of food. In this situation it was evident that America must build ships and to do so, the civilian population not only needed to be aroused, but needed some means of judging from day to day what was being accomplished. Gantt selected a unit of measurement, "rivets driven", easily understood by everybody and which, on the one hand, set the task to be accomplished, and on the other determined from day to day what was being done. He also improved the operation of ships for the Shipping Board by means of ship-movement charts, showing what they were doing day by day to speed up their movements (Alford 1934, 193-206).

Above all what Gantt did for the bodies he served was allow them to plan their production. When production was recorded on a chart seen by all, it was definite and accurate and promoted the assignment of clear-cut tasks to individuals. The Gantt Chart compares what is to be done with what was actually completed, thus keeping the executive advised as to the progress made in the execution of the plan, and if the progress is not satisfactory it tells the reasons why (Alford 1934, 214). In this way, "the war effort took a measurable turn as a result of Gantt's efforts. Materials flowed more smoothly, shipbuilding blossomed, and America's productive might was brought to its greatest outpouring of goods" (Wren 1987, 137-138). For his efforts, Gantt received a Distinguished Service Medal, whilst his chart was heralded by his partner, Wallace Clark, "as the most notable contribution to the art of management made in this generation". It was later popularised by Clark in a book that was translated into eight languages and formed the basis by which the Soviet central planners implemented their Five-Year Plans. Gantt's efforts, along with those of Cooke, have to be considered a major contribution by Taylorists to US mobilisation, despite Stabile (1985) and Nelson's (1992) claims to the contrary.

3 The Socioeconomic Consequences of Planning

Far from sacrificing future progress by our experiments in collectivism, we are rapidly putting ourselves in the way of acquiring, from a few years of war, more genuine experimental knowledge of the conditions of economic efficiency in the large than we could probably have gained in as many decades of individualism, business competition, and the ventures in socio-economic experimentation that can be argued through legislative assemblies in time of peace.

John Maurice Clark

A. Immediate Results

One can attempt to assess the effectiveness or otherwise of planning in supplanting the market by examining the large increases in totals of production and by structural changes within these aggregates. However, it should be noted that the question of whether or not these aggregates would have been larger or smaller without planning is a moot point; as is the question of whether such changes were as a result of huge war demands or as a result of conscious planning. Whatever the case, economic theorists were greatly impressed by the possibilities that planning had revealed. During this period,
the American economy had demonstrated a capacity to produce at levels that had previously been held to be unattainable. This accomplishment had involved an unprecedented degree of government intervention in the economy in which leaders in government, in the business community, and in the economics profession had collaborated. Nothing quite like it had occurred during the lifetimes of the major participants, and the results had been impressive. Despite committing a substantial share of its resources to the prosecution of the war and the support of its allies, the nation had so enlarged its production that it could weather these years with little sacrifice in current consumption by the civilian population. Clearly the American economy possessed capacities far greater than had formerly been suspected (Barber 1985, 1-2).

The nation's wealth increased with GNP (in 1958 prices) rising from $126 billion in 1914 to $152 billion in 1918. Low pay groups benefited the most, owing to the relatively faster demand for their services. Within the GNP (measured in 1914 prices), the military component increased by $11.2 billion between 1917-1918, compared to a meagre increase of $100 million between 1914-1917. The nonwar component decreased by $13 billion between 1917-1918 (Soule 1967, 39; Fearon 1987, 14).

Under government control, the number of new railroad locomotives increased from 4075 in 1916 to 6475 in 1918. Gross tonnage of new ships grew from 325,000 in 1916 to 1,301,000 in 1918. Output of aluminium grew from 110.02 million pounds to 132.2 million in the same period. But output of consumer goods declined for the most part, with the only notable exception being cigarettes (Soule 1967, 39). Looking at changes in the labour force brought about to produce the goods increasingly demanded at home and abroad, we can see that the manufacturing labour force rose from 8.2 million in 1914 to 10.2 million in 1918, largely as a result of a shift of workers from agriculture to industry (Fearon 1987, 7). The Ford workforce, for example, grew from 32,000 in 1916 to 48,000 in 1918, whilst for General Motors in the period, the increase was from 10,000 to 50,000 - both largely as a result of the army's demand for trucks, cars and airplane engines (Wynn 1986, 79). Wages in industry rose, with average annual earnings for manufacturing workers rising steadily from $580 in 1914 to $980 in 1918 before peaking to $1358 in 1920 (Fearon 1987, 8).

Total capital expenditure in the US leaped from $600 million in 1915 to $2.5 billion in 1918, and the total number of manufacturing establishments rose by 5%, and the physical volume of manufacturing output rose by 26% between 1914 and 1919. By 1919 the number of leading industries using electric power was 16.3 million, almost double the 1914 figure, whilst profits also increased dramatically. Figures for overall profit, below $4 billion in 1914, were over $10 billion in 1918. The average annual prewar profit for US Steel was $76 million; in 1917 it was $478 million. This was very much an economic boom period (Wynn 1986, 79-81).

Manufacturing was not the only sector to be affected by war planning. The Allies wanted food and raw materials and turned to the US as provider. The demand for foodstuffs gave an enormous impetus to expansion in farming such that the war years provided a boom period in agriculture as well. The value of farm produce rose from $9.8 billion in 1914 to $21.3 billion in 1918, and farm production increased overall by nearly 30%. The incomes of farmers were dramatically improved, with farm income rising from $4.5 billion in 1914 to $9.6 billion in 1918, and average net income that each farmer received for their operations rose from $649 to $1,370 in the same period (Wynn 1986, 81; Fearon 1987, 9-10).

Despite the government's huge claim on the nation's resources, normally termed "crowding out", J.M. Clark (1931, 170) reports that "despite this huge diversion of effort, America suffered very little in an economic way". Though 25% of the national income was committed to war purposes and nearly 30% of the gainfully employed population was engaged in war work, the increase in productive effort offset about 40% of the claims made by the war
planning apparati on the economy's resources. Though the output of goods for private consumption shrank, this does not indicate that the war decreased consumption. Such a shrinkage in private consumption, Clark asserts, "was due in considerable part to postponing the renewal of durable goods". In other words, though the civilian population may have had very little in the way of new consumer goods available for them to purchase, their incomes actually increased (Clark 1931, 170-171).

B. Mid-Term Consequences: 'Return to Normalcy' and the 'New Era' in the 1920s

The "return to normalcy" that Warren G. Harding pledged in his successful presidential campaign in 1920 sums up the temper of American political economy in the early 1920s. The US, revolting inchoately against the whole progressive mythology of the war as an opportunity for America to organise a new civilisation, returned to the dogma of isolationism. They felt that they had turned aside from neutrality to engage in a European struggle and had got nothing out of it. Therefore they decided to repudiate all collaboration with Europe, raise tariffs on foreign goods, exclude immigrants, embargo foreign ideas, and ensure that the Allies discharge their debts to the US Government on commercial terms (Soule 1967, 51).

The international retreat gave a signal for retreat on all fronts in the US. With Harding, and subsequently Calvin Coolidge at the helm, support for the status quo ante had influential weight behind it. Paramount importance was now placed on minimal government intervention in the economy, on the sanctity of fiscal responsibility and balanced budgets, and the moral obligation of the Allies to honour their war debts. Coolidge summed up the mood of the time in asserting that "the business of America is business." He is quoted elsewhere as saying that "(i) If the Federal Government should go out of existence, the common run of the people would not detect the difference..." (Schlesinger 1957, 59). The corollary of this was that government should generally stand aloof from the functioning of the free market economy and that the US should return to "business as usual" (Barber 1985, 1).

As soon as the war finished, the planning bodies were phased out. The WIB was closed within a week of the armistice, and the constituent business volunteers opted for the free market once again. Wartime planning, in this 'business as usual' view, was the exception rather than the rule in laissez-faire, "but not one from which any rules for the conduct of business in peacetime could be derived" (Barber 1985, 4-5). There was a drive to scrap every vestige of wartime control in the interest of the public or consumer, combined with an effort to thwart the erection of anything better in its place. There were indiscriminate attacks on newer socioeconomic philosophies in the name of patriotism. There was an attack against labour organisation and collective bargaining. With the removal of the War Labor Board went the wartime security of standards of working hours and wages. Steelworkers were now working a seven-day week and a twelve-hour day. When the newly organised union demanded a six-day week and eight-hour day, Judge Gary of US Steel would not confer with representatives of the union or change the practice. A federal judge issued an injunction forbidding a coal miners' strike. There were new federal laws for minimum wages or maximum hours to substitute for the labour administration which had heard grievances and adjusted conditions during the war. The free market and its excesses clearly had regained its reign (Soule 1967, 53-54). As Soule suggests,

"(t)here is no question that, during the 1920's, business would be dominant. That does not mean that business itself was organized to control economic life. The nation was not dominated by an industrial government or an economic dictatorship; far from it - economic processes went on in the usual unplanned and competitive anarchy..." (Soule 1967, 56-57).

But this is not to say that there existed no individuals who denied that the exercise in war planning should be forgotten with the cessation of hostilities. Some economists and
members of the Taylor Society believed that the war had vindicated their belief that conscious, systematic intervention in the production process had the potential to dramatically expand the wealth of society (Person 1919, 10-14). Immediately after the war, some economists were alarmed at the dismantling of the planning apparatus, fearing a massive drop in aggregate demand and resultant unemployment. By late 1918, 25% of the civilian labour force were engaged in producing goods, many of which would not be required in peace. Furthermore, over four million military personnel had to be demobilised. The possibility of vast immediate unemployment upon the cessation of hostilities received considerable attention in an editorial of the Journal of Political Economy in November 1918. It was argued that it was foolish to expect an 'aggregate demand' to replace immediately the huge cancellation of government contracts - industries supplying war needs and those supplying raw materials would undoubtedly be affected, as would be their employees. The editorial indicated that a positive government plan was necessary to provide buffer employment for the surplus labour discharged from industrial mobilisation and to stimulate the resumption of peace-time industry as rapidly as was consistent with stability. A system of public works and government indemnity of business risks were two tools mooted as solutions for unemployment and business uncertainty.

For instance, Wesley Mitchell asserted of the postwar period that "(t)he need for scientific planning of social change has never been greater, the chance of making those changes in an intelligent fashion...has never been so good". And of the peacetime problems that would inevitably rise, he asserts that it seems impossible that the countries concerned will attempt to solve them without utilizing the same sort of centralized directing now employed to kill their enemies abroad for the new purpose of reconstructing their life at home...It seems probable that for a long time to come, perhaps always, we shall increasingly use intelligence for guiding the social economic forces, relying more on trained people to plan changes for us, to follow them up, to suggest alterations (cited in Dorfman 1949, 490).

In his presidential address to the American Economic Association in December 1918, Irving Fisher, a member of the Taylor Society, struck a similar note to Mitchell. Whilst he applauded the role of economists lending their skills to war work, he challenged his colleagues to participate in the shaping of a "new world." The great lesson of the war, according to Fisher, was the successful manner in which a democracy enlisted the "active initiative, the enthusiastic interest and will to help, of the people." The time was now ripe, Fisher asserted, to ensure that cooperative endeavour for the common good was something that would be sustained (cited in Barber 1985, 2).

Thus it can be seen that the 'return to normalcy' was not as complete as is often thought, and that the planning experience was not forgotten by all but had actually made a large impact on economic thought. That this influence became more than a memory is largely due to the efforts of Herbert Hoover. This "forgotten progressive", who in his respective positions as president of the Federated American Engineering Societies, Secretary of Commerce, and President of the US, became the most prominent advocate of planning through the 1920s. Though an enthusiastic supporter of capitalism, Hoover accepted that the market did not always allocate resources in the most efficient manner and supported the use of the visible hand of planning at both a micro and macro level, thinking of himself as a "scientific manager of the economy" (Barber 1985, 99).

However, Hoover was not a 'statist' and rejected federal government direction of economic activity - the state itself was not to directly plan and direct industry. By planning he meant decentralised and voluntary cooperation between government and business via trade associations, wherein the state would assist firms to plan effectively by accumulating and disseminating knowledge of existing trends within the economy. This comes out in Hoover's
Waste in Industry study of 1921 wherein he prescribed the "coordination of all the great industries" by the provision of appropriate knowledge as the solution to the instability of the business cycle. As Secretary of Commerce he continued this trend by reorganising the census into a reliable bureau of statistics; his department began to issue the monthly Survey of Current Business, a sourcebook of primary and secondary statistics; he organised the first ever national unemployment conference preparing stabilisation reports for reducing the volatility of the business cycle and unemployment; and he encouraged all US industry to regularise their operations by planning production effectively: closely correlating their production schedules with sales policies and planning their investment so that it would be a stimulant in times of recession (Bruce and Nyland 1993, 9-18).

C. Long-Term Consequences: The New Deal and the Analogue of War Planning and the Reception of 'Keynesian' Economic Strategy

War planning and the industrial planning of Hoover's 'associative state' had a profound impact on the response of the Roosevelt Administration to the depression of the 1930s. It greatly influenced Roosevelt's experiments in planning under the NRA and shaped American political economy in that it laid the ground for the reception for the 'Keynesian' strategy adopted in the postwar period of expanded mass consumption via the intervention of the state. That there is an intellectual link between war planning, Hoover, and the New Deal is widely accepted in the literature. Reagan for instance, argues that

American national planning emerged long before the crisis of the Great Depression...Planners in the United States built the organizational networks for national planning in response to the concerns and needs of Progressive reformers, wartime mobilizers of 1917-18, and the associationists of the New Era centered especially around Secretary of Commerce Herbert Hoover (Reagan 1988, 97; see also Perna 1988; Graham 1977; Roos 1937).

Or as Leuchtenburg (1990, 83) asserts, "(i)n addition to employing the metaphor of war to explain the meaning of the depression, the 1930's drew on the experience of the economic mobilization of World War I for instrumentalities to combat hard times".

Unlike Hoover's dogged commitment to laissez-faire and his reluctance to directly intervene and salvage the US from depression, Roosevelt proved from day one that he was not going to be servant to an economic philosophy that clearly was not functioning efficiently. In the three months following his inauguration, the so-called 'Hundred Days', the US socioeconomic system was subjected to a presidential barrage of ideas and programmes unlike anything known to American history. Given that his "Brains Trust" contained former members of the Taylor Society and ardent supporters of planning, including Henry Dennison and Rex Tugwell, and also that his administration contained former members of the War Industries Board, it is no surprise that Roosevelt's recovery measures had a definite flavour of the war experience.

From July 1933 to August 1943, staff devoted to economic planning appointed by Roosevelt to the National Resources Planning Board (NRPB) steered New Deal efforts at state-sponsored national economic and social planning. In answer to the Great Depression, these New Deal planners established a permanent arsenal of public works projects that could be employed as a countercyclical measure in response to business cycle downturns, created regional planning boards in New England and the Pacific Northwest, founded state planning boards in a majority of states, and developed compensatory spending policies usually credited to Keynesian economists (Reagan 1988, 86).

These planners' institutional experience from 1900 to 1933, especially that of war planning, led them to reject 19th century liberal distinctions between separate private and public sectors. Their belief in 20th century managerial and technical expertise as a way of
promulgating economic stabilisation via fostering cooperation amongst private and public organised groups meant that, for them, democracy and national planning were antithetical. In fact,

(in attempting to promote social and economic balance between organizational groups, American national planning - unlike its European counterparts - drew on the voluntarist tradition to conserve elements of the past while looking to the future (Reagan 1988, 86).

This tradition, as stated above, consisted of the experience of mobilising voluntary associations under federal auspices in 1917-1918 and also of industry-level planning under Hoover, both in his roles as Commerce Secretary and President. In sum, New Deal planning evolved from the organisational nexus emerging from the ideas, experiences and institutional networks of the figures who became the nation's planners. It involved an attempt to bring together technical experts as advisors to political leaders and representatives of organised groups in both public and private sectors in a bid to promote economic stabilisation and social cooperation (Reagan 1988, 95; 97).

Another long-term consequence of war planning was that, via its role in shaping the thinking of economists and the construction of the NRA, it provided fertile ground for the reception of the 'Keynesian' economic strategy. Pabon (1992) traces the political discourse articulated by the Taylor Society from its inception as an industrial research organisation to its development as an important policy-making network during the New Deal. He focuses on key figures in and around the Society, such as Morris Cooke, Henry Dennison, Rexford Tugwell and Louis Brandeis, highlighting the fact that this network was critical of the corporatist program embodied in the NRA, under which the state sanctioned cartel-like arrangements among capitalists to reduce destructive competition, restrict production and fix prices. These figures were critical of this industrial self-regulation, according to Pabon, as it entailed minimal state intervention and a reduced role for unions and collective bargaining. They advocated an expanded and strong role for the state and unions in political economy, along with macroeconomic policies that promoted social purchasing power and expanded mass consumption. He asserts that during the 'Second New Deal' from 1935, these 'Keynesians' entered the corridors of power and many took key administrative positions in the welfare state, from whence they attempted to shape American political economy.

Likewise Bruce (1992) makes a similar point to Pabon, by examining the Taylor Society journal, The Bulletin of the Taylor Society, which recorded the thoughts and policies of the Taylorists in this period of depression. The bulk of papers submitted in the 1930s pointed to underconsumption and oversaving caused by income inequality as the cause of the depression, and the need for increased government involvement in managing aggregate demand to remedy such. Planning was the watchword of the 1930s, not only in the ranks of the Taylor Society, but also to some extent in economics circles, with the likes of J.M. Clark and Rex Tugwell bringing into question the efficacy of laissez-faire.

As the studies of Bruce (1992) and Pabon (1992) assert, the Taylorists and the intellectual network around them, in and outside of the New Deal, were debating the merits of the free market, 'Keynesian' strategy and planning. Keynes' writings crept across the Atlantic into the Bulletin of the Taylor Society, the New Republic, the Yale Review, and the Atlantic Monthly. This provided a receptive audience for the General Theory once it was published in 1936, and paved the way for the rise of the welfare state. Progressivism had clearly emerged as a political economic strategy: from the 'shouts in the wilderness' of philosophers, through the ascent of Taylorism and war planning, and now to a responsible and active state served by technicians.
Conclusion
The paper has illustrated how the Wilson war administration, in conjunction with organised industry and technical experts, was compelled to undertake a near complete transition from the doctrine of individualism and free competition to one of centralised national cooperation and planning in moulding the industrial system for the emergency of war. This was seen to impact on the thinking of economists vis a vis the relative strengths of planning and the market. The role of the Taylorist movement in these planning efforts, in particular Morris Cooke and Henry Gantt, was also examined. In so doing, the assertion that the Taylorists had little impact on the war has been challenged. The war planning did not substitute state ownership of the means of production for private enterprise. Rather it gained its success by channelling a larger share of market demand through national agencies like the WIB. As the dominant purchaser, the government could do much to boost the total output of the nation and to adjust it to the most pressing needs. The economy could thus be rationalised and made more efficient (Soule 1967, 47).

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References


Cleveland, F.A. (1911), 'The Application of Scientific Management to the Activities of State and Municipal Government', in Dartmouth College Conference on Scientific Management: Amos Tuck School of Administration and Finance.


