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foreign affairs in the first Soviet government, founder of the Red Army and commissar of war from 1918 to 1925, cofounder of the Communist International, member of the Politburo of the Soviet Communist party from 1918 to 1927, and Stalin's chief antagonist and critic; he was also an outstanding thinker and original theorist of Marxism, whose ideas strongly influenced socialism and communism in the first four decades of this century.

Permanent revolution

The theory of permanent revolution is Trotsky's principal contribution to Marxism and the leitmotiv of his political activities. He first formulated that theory in a treatise called *Results and Prospects*, written and published in 1906, while he was in prison awaiting trial by a tsarist court for his leading role in the 1905 St. Petersburg Soviet. The origins of the theory can be traced back to the writings of Karl Marx, and it was also influenced by A. L. Helphand-Parvus, a Russo-German Marxist of note. But its actual formulation and application to the revolution of the twentieth century, and to Russian circumstances, was Trotsky's own work.

Trotsky viewed the transition of society from capitalism to socialism, postulated by Marxism, as an immense succession of socioeconomic and political upheavals leading to the establishment of an international classless and stateless society. No single phase of this revolution, whatever its social character or geographic limitation, can be regarded as self-contained or self-sufficient. The process of society's transformation is in the nature of a chain reaction that cannot be arbitrarily interrupted or arrested. The revolution develops intensively, by "deepening" and affecting the whole structure of society, and extensively, by assuming international scope.

From these general premises Trotsky developed a specific, prognostic analysis of the character of the Russian revolution. He rejected the view, which had been generally accepted by Marxists, that the Russian revolution would have to be bourgeois in character, as the French revolution of 1789-1793 had been. In this traditional Marxist view, the "task" of the revolution was to overthrow tsardom, sweep away obsolete semifeudal relationships and institutions, and establish a parliamentary democratic republic, under which Russia's productive forces would be free to develop on a capitalist basis and its working class free to wage its class struggles until such time as Russian society became sufficiently "mature" for socialism. Up to World War I even Lenin and the Bolsheviks adhered to this view, although Lenin occasionally deviated from it.

The differences between Bolsheviks and Men-

TROTSKY, LEON

Leon Trotsky (Lev Davidovich Bronstein) was born in the Ukraine in 1879 and assassinated in Mexico in 1940. Trotsky was not only a leader of the October revolution of 1917, commissar of

sheviks centered at that time on the question of which social class, the bourgeoisie or the workers, should exercise leadership in the revolution. The Mensheviks maintained that since the revolution was bourgeois, the bourgeoisie should lead it, while the workers should lend the bourgeoisie their critical support. Lenin argued that the Russian bourgeoisie was frightened of revolution and willing to compromise with tsardom; consequently, only the working class, with the support of the peasantry, could accomplish this bourgeois revolution—despite and against the bourgeoisie. Trotsky agreed with Lenin's view that the industrial workers were the chief motive power of the upheaval, but he pointed out that precisely because of this the revolution could not remain bourgeois. He asserted that it would be driven by its own momentum beyond the limits set to it a priori by the traditionalist theory and that it would present a peculiar combination of two revolutions, a bourgeois one and a socialist one. Once the proletariat had assumed the leading role, it would be compelled by the logic of its own class interest to turn against the capitalists as well as against tsardom and the landlords; and it would proceed to establish its own dictatorship and to socialize the means of production. Russia, Trotsky predicted, would be the first country to set up a proletarian dictatorship. This was a startling and hotly contested conclusion: all Marxists, including the Leninists, still held that such a dictatorship could first be established only in one of the advanced industrial countries of the West.

Trotsky went on to point out that because of its industrial and cultural backwardness and poverty, Russia could only *begin* the socialist revolution (or the building of socialism) but could not achieve or *complete* it except in association and cooperation with the industrial countries of the West. Indeed, the Russian revolution would not be a purely national phenomenon; it would be the prelude to European or global revolution. Just as the revolution would not be contained within its bourgeois stage, so it could not be brought to a halt within any national boundaries. Internationally as well as nationally the revolution would be "permanent."

As author of this theory, Trotsky linked up with the classical Marxist tradition, but he also departed from it. He was the first Marxist to proclaim that the initiative for the anticapitalist revolution of this century would come from the underdeveloped part of the world rather than from the West. But he remained within the classical Marxist tradition insofar as he continued to see in the industrialized countries of the West the terra firma of socialism, its decisive domain, its chief potential center. A

backward country like Russia could and would have the lead in revolutionary initiative, but the lead in the actual establishment of socialism would still belong to the West.

Shortly before 1917 Lenin arrived independently at the same conclusion, and this induced Trotsky to join the Bolshevik party. The idea of permanent revolution was embodied in the programmatic statements of the Communist International during the time that Lenin and Trotsky were its leading lights. It should be added that Trotsky did not favor coups or putsches staged by revolutionary minorities unsupported by the mass of the workers and that he was categorically opposed to "carrying revolution abroad on the point of bayonets." Permanent revolution, as he saw it, was an organic historic process, inherent in the logic of the class struggles and political conflicts of the age.

The most dramatic implication of Trotsky's theory emerged in the 1920s, at the time of his conflict with Stalin. The great ideological controversy in the Bolshevik party after Lenin centered on the doctrinal opposition between two theories: Trotsky's permanent revolution and Stalin's socialism in a single country. Stalin asserted the self-sufficiency of the Russian revolution; and, at least up to World War II, his doctrine was manifest in a policy of Soviet isolationism and self-containment. As such it was necessarily antagonistic to the idea of permanent revolution. Trotsky proceeded to demonstrate theoretically the impossibility of an autarchic socialism, of a socialism confined to any single country, especially to a backward country in which the small-holding peasantry formed the majority of the population. He characterized the Soviet regime as a transitional social order, combining socialist and capitalist (and even precapitalist) elements; but he refused to recognize it as genuinely socialist. He viewed the isolation of Bolshevism within Russia's boundaries as a mere interval between two acts, as it were, of permanent revolution, an interval unduly prolonged by Stalinist errors and opportunism, but not a definite interruption of the revolutionary process. (Trotsky probably would have regarded the revolutionary aftermath of World War II, culminating in the Chinese revolution, as a continuation of the process begun in Russia in 1917, the long overdue new phase of permanent revolution.)

Critique of Soviet bureaucracy

Among Trotsky's many contributions to Marxist thinking, the one next in importance to his theory of permanent revolution is his critique of the Soviet bureaucracy. He was, with Lenin, an uncompro-

misgiving advocate of proletarian dictatorship, and, again like Lenin, he held that this dictatorship ought to be based on "proletarian, or Soviet, democracy." Its purpose was to consolidate the conquests of the revolution, to suppress the resistance of the former possessing classes, and to guarantee the social and political supremacy of the working class. This aim could not be achieved unless the workers, the poor peasants, and the social groups close to them enjoyed full freedom of expression and association. During the civil war such freedom was severely curtailed; and in the early 1920s the single-party system was established. Trotsky at first treated this as a kind of emergency measure and refrained from elevating the practice of the single-party system to a principle. Presently, he came into conflict with the practice. As early as 1923 he had diagnosed the onset of a postrevolutionary reaction and the incipient "degeneration" of the Bolshevik party; and he had protested against the growing preponderance and arbitrary behavior of the party's bureaucracy. Between 1926 and 1928, characteristically invoking various precedents from the French Revolution, he warned of the dangers of a Russian Thermidor, Bonapartism, and Restoration. (Later still, in the 1930s, he maintained that Thermidor and Bonapartism were no longer dangers threatening the revolution but accomplished facts.)

Trotsky saw the bureaucracy and the managerial groups of the Soviet Union as the new privileged strata who had usurped the fruits of the revolution and deprived the working class of its rights; he attacked Stalinism as the ideology of the new privileged strata. Up to 1934-1935 he advocated a reform of the Soviet Union, aiming at the revival of Soviet democracy; but in his last years he called for the overthrow of the bureaucratic dictatorship and of Stalin's personal rule by means of *revolution*. However, he insisted that the Soviet bureaucracy was not a new and independent social class, exploiting other classes, but a "cancerous growth on the body of the working class"; that the Soviet Union was, even under Stalin, a "workers' state," although a "degenerate" one; and that Marxists were obliged to defend the Soviet state "unconditionally" against its capitalist-imperialist enemies. He advocated a revolution against Stalinism that, as he explained, was to be political, not social: its aim was to do away with Stalin's oppressive government, to reduce the new inequality, to abolish the single-party system and the "leader cult," and to bring the state under workers' control. But the revolution was not to change anything in the basic system of social ownership of the means of production; on the contrary, it was to preserve that

system and revitalize it. These views aroused vehement controversy among Trotsky's adherents, some of whom (like James Burnham and others) considered the Soviet bureaucracy to be a new exploiting class and Soviet society a "managerial society," not different in kind from the German society under Hitler or the Italian under Mussolini. (In consequence they renounced all political solidarity with the U.S.S.R. and broke with Trotsky.)

Other contributions

While the ideas just summarized are at the core of so-called Trotskyism, the importance of Trotsky's contribution to the strategy and tactics of the Communist International should also be stressed. Trotsky was in 1921-1922 one of the chief initiators of the policy of the "united front"; and in his later critique of the Stalinized Comintern his analysis of the rise of Nazism was most remarkable. He was the first, if not the only, Marxist to grasp clearly the totalitarian character, the destructive explosiveness, and the imperialist fury of Nazism. While Stalin and his followers underrated Nazism, treating it as a more or less conventional form of reaction ("one of the agencies of finance-capitalism"), Trotsky, as early as 1929-1930, diagnosed it as a new plebeian form of counterrevolution, drawing its dynamic force from the despair of the petty-bourgeois and lumpenproletarian masses faced with the unemployment and misery of the great slump of 1929-1932. He advocated, in vain, joint socialist-communist action to prevent the seizure of power by Hitler and the new world war Hitler's victory could bring. In 1935-1936 he criticized as opportunistic and defeatist the Stalinist "popular front" policies, especially as applied in France and Spain. In subsequent years he exposed the great purges and the Moscow trials by which Stalin exterminated all his communist critics and opponents; and he founded the Fourth International.

Trotsky was a many-sided personality, a man of action as well as a theorist, a prolific author and an orator of genius. He was unrivaled as a Marxist writer on military theory. While Clausewitz treated war as a "continuation of politics by different means," Trotsky showed it to be a continuation also of economics, class struggle, and social psychology. He was a historian of the highest order; his *History of the Russian Revolution* (1931-1933) is a huge artistic canvas depicting the events of 1917 as well as a theoretical interpretation. His biographical gifts are evident in *My Life* (1930a), in his various writings on Lenin, and to a lesser extent in his *Stalin* (1941). He was outstanding also as a literary critic. His use of Marxism as a tool of artistic

criticism was free from dogma; and he was uncompromisingly opposed to the manufacturing of any "proletarian culture" or "proletarian literature" and to any form of party tutelage over the sciences and the arts. He defended Freudian psychoanalysis against Bolshevik and Pavlovian critics; and in one of his popularizations of dialectical materialism he confidently predicted, in the year 1926, the advent of the atomic age and forecast that the new technological revolution would coincide with and accelerate the social revolution of this century.

He was defeated in his lifetime, slandered, and assassinated. His works and memory were still banned from his native country even in the 1960s, well after the collapse of the Stalin cult. But his ideas—his views on capitalist society, his critique of postrevolutionary bureaucratic privilege and of nationalist (Stalinist and Social Democratic) distortions of socialism—remain relevant to the issues agitating the communist camp and the world at large in the second half of this century.

ISAAC DEUTSCHER

[For the historical context of Trotsky's work, see COMMUNISM; MARXISM; SOCIALISM; and the biographies of LENIN and MARX.]

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MUNITIONS INDUSTRY. From the early economy of primitive tribes, among whom there was little differentiation between articles of daily use and implements of war, there developed handicraft manufacture of defensive and offensive weapons. The sword and armor industry of the Middle Ages did not progress beyond this stage, even when it produced for export. The making of powder and cannon also remained essentially handicraft arts, even when comparatively large quantities of gun barrels were cast or forged in a short time and the iron used for the guns was obtained from mines organized on a primitive capitalistic basis. As late as the age of absolutism the slight demand for munitions was filled in a far from uniform manner. A minor portion was supplied by state factories while the rest came from plants leased by the state to entrepreneurs who employed workers under a contracting-out system or was obtained by occasional large purchases abroad, depending on how the requirements could best be met at any given time. Amsterdam was noted as a source of muskets, while many cannon came from Stockholm. The French and Swedish ordnance works of the eighteenth century were largely in the hands of the higher nobility, who made large profits from them.

The establishment of armament manufacture as a special branch of fully developed capitalist production of considerable economic and political importance occurred largely during the second half of the nineteenth century. In this period the increasing technical precision required in the material supplied and the large accumulations of capital needed for mass production led to the elimination of most of the small plants and the concentration of production in the few plants in each country which were able to turn out high quality armaments under modern conditions. Constant technical advances in the industry and the rapidity with which types of arms change heightened the competition still more and increased the number of industrial casualties. Further development along

this line led inevitably to a tendency toward monopoly within each important country.

Ordnance works have always played a leading role in the munitions industry, while small arms plants have risen to prominence only occasionally, although they sometimes grow into large concerns with considerable political influence and economic importance, as in the case of Mauser, Ludwig Loewe and the Berlin-Karlshuhner-Industriewerke under the management of Paul von Gontard. Rifle factories have, however, found it increasingly difficult to obtain positions of importance without affiliation with ordnance works. The munitions industry as a whole, in spite of its political importance, constitutes so small a fraction of the total of big industries that as a national economic factor its significance is relatively small in time of peace.

The founders of the modern munitions industry did not start out with the intention of becoming armament industrialists. Some, as in the case of Ehrhardt, Alfred Nobel, Armstrong, Andrew Noble, Whitehead, Maxim and Zaharoff, entered it as the result of inventions which proved useful in warfare or simply in search of profits. Others, such as Krupp, Schneider, Vickers, Skoda, Whitworth, Carnegie, Schwab and Harvey, originally owned industrial plants manufacturing articles of peacetime use and turned later to munitions, for which their plants were peculiarly adapted.

The link between the development of war material and the manufacture of peacetime products often developed out of the parallel increase in standards of quality which marked the latter half of the nineteenth century. Those ordering both sorts of material repeatedly required that large orders be turned out extremely quickly and with the highest precision. The same material was used in the manufacture of big guns as was employed for many high quality peacetime products. The manufacture of propeller shafts, rails and car wheels was among the first big problems of the steel industry simultaneously with the manufacture of steel ingots for big guns and the forging of armor plate. A number of the older munitions works therefore made both high quality railroad material and war material.

War and peacetime production had other points of contact than quality standards. Important items of peacetime steel production automatically served war uses as well. The propeller shafts on fast steamships propelled armed auxiliary cruisers in time of war, and since rail-

roads have played a part in military operations since the German-Danish war of 1864 and the American Civil War, car wheels and rails are also indirectly war material. From the end of the nineteenth century onward wartime and peacetime production have drawn closer and closer together. All general staffs were deeply interested in the evolution of the early automobile into a usable motor truck. Radio telegraphy cannot be differentiated at all in practice into war and peace telegraphy. The chemical industry has been drawn into the manufacture of war material to such an extent that there is no longer any chemical industry that is not a munitions industry as well, while in the manufacture of airplanes and airplane motors the last difference between production for war and peacetime purposes has vanished. In plants of this sort peacetime production may outweigh production for war purposes or vice versa. It is a question not so much of the quantity of each kind of production as of their relative importance to the plant. Even though approximately 60 percent of Vickers' total production for 1913, for instance, was for peaceful purposes, the plant nevertheless bore the stamp of a specific munitions concern.

As the development of the munitions industry has thus gained impetus from peacetime industrial advances, so industry in general has been helped by lessons drawn from wartime experience in munitions work. Developments in the munitions industry during the World War, for instance, threw much light on labor problems, hours, wages, welfare and the hitherto largely unrecognized possibilities of woman's work in new fields. The nature of skilled, semi-skilled and unskilled grades of work was brought out also. The possibilities of industrial progress through the encouragement of science, notably chemical science, were clearly revealed by the war, while engineering skill and knowledge received a great impetus.

From the beginning of the munitions industry in the modern sense to the 1890's was not a period of ordinary competition between firms turning out similar products, but was rather one of bitter struggle between two ordnance systems and a race between guns and armor plate. The two competing methods of ordnance manufacture up to the World War were the Armstrong wire wound process and the Krupp shrunk hoop process. Both of these processes emerged during the 1850's and were the starting points for the growth of the largest British and German

munitions firms. In the most embittered competition each firm endeavored to secure orders for the artillery of its own country and to drive its competitor out of the latter's home market. Armstrong succeeded in obtaining the contracts for the British navy, but only for a short time, until technical changes made him wholly dependent on the foreign market. By the use of a very high grade, although extremely expensive crucible steel, Krupp secured the Prussian army contracts fairly easily and was able to retain this monopoly until the appearance of the Ehrhardt recoil barrel gun. Krupp's prolonged but finally unsuccessful opposition to the adoption of the recoil barrel cost that firm world leadership in field gun construction, although it did not affect its rank as a designer of heavy artillery and armor plate. In the design of field guns Schneider-Creusot took the lead.

The other great nineteenth century armaments contest was between guns and armor plate. In the naval armaments race of the 1860's France and England developed seaworthy and serviceable armored frigates, the *Gloire* in 1859 and the *Warrior* in 1861, followed by other ships with increasingly heavy armor and bigger guns. This race between guns and armor was based upon a purely mechanical increase in the thickness of iron armor and a similar rise in cannon caliber without any improvement in the quality of either, until the giant 45 cm. guns could no longer be serviced and the ships could not carry the masses of iron armor plate. The nature of the contest changed during the 1880's when the gun caliber was reduced in favor of improved quality, while a more complex method of manufacture—compound and all steel plates—took the place of simple iron armor. After a short interval, when the Harvey hardening process was employed, the race in its initial form was settled by Krupp's cemented armor plate in 1893. This finally came into such universal use that in the battle of Jutland both the British and German fleets were equipped with Krupp armor plate.

Toward the end of the nineteenth century with these conflicts settled, the movement toward concentration in the munitions industry, which had begun in the 1850's took on added impetus. The invention of smokeless powder to take the place of black powder gave the explosives factories a new importance in armaments. In 1886 Alfred Nobel amalgamated his world wide dynamite and powder interests into the Nobel Dynamite Trust Company, Ltd., in

London, directly controlling the international explosives trades.

Shortly thereafter the move toward concentration began in the British munitions industry as the monopoly positions of the older firms were broken by newer competition. Because Armstrong had raised the prices of guns and Brown and Cammell that of armor plate, both lowering the quality of their products at the same time, the Admiralty aided the development of the Vickers firm, which had a talented ordnance designer in Lieutenant Dawson. It made an improved all steel armor plate instead of the compound armor plate, while it strengthened its financial position for big munitions orders by raising its capital from £150,000 to £750,000. A few years later in 1891, the Admiralty allowed a fifth firm, William Beardmore and Company, Ltd., to participate in the armor plate bidding. The battle between these firms ended with large scale mergers. In 1897 Armstrong absorbed the independent Whitworth armor plate plant, Vickers bought up the Maxim-Nordensfeldt works, and Brown the Clydebank shipyard. Immediately after Sir William Armstrong's death Zaharoff, the director of Vickers, put through the biggest merger ever made in the munitions industry, bringing together Vickers, Armstrong and Beardmore. Vickers abandoned gun manufacture, Armstrong gave up the production of armor plate and Beardmore was relegated to a subordinate position in the shipyards of the trust through the purchase by Vickers of a controlling interest in its capital stock. A competing concern of smaller size, the Coventry Ordnance Works, was formed to dispute the field with this giant merger, but the Zaharoff group was able entirely to exclude its new competitor from the building of big warships up to 1910. In the few remaining years before the outbreak of the World War the Coventry works did considerable business, particularly in the expansion of the Russian fleet, but it was unable seriously to threaten the supremacy of the Zaharoff group.

Compared with the tremendous concentration of the English munitions industry under Zaharoff's control the Krupp concern took second rank in size and capacity, although it too had abandoned the sole manufacture of ordnance in the 1890's and developed into a producer of all kinds of armament material. In 1893 it bought up the Gruson works in Magdeburg, which specialized in the manufacture of armored turrets for foreign countries, and began the manufacture of Krupp armor plate. In 1896 it ab-

sorbed the small Germania shipyard in Kiel and a machinery plant, expanding them into big establishments. Internationally, however, Krupp was far outdistanced by the Zaharoff group. Its comparative weakness was further increased by the leasing of its patents in 1902 to the financially insolvent Skoda works, which were turning out very poor cannon. Skoda gradually got control of the Austrian market, but it failed completely in its efforts to penetrate the Balkans. Krupp was forced further and further back in the construction of warships and the production of ordnance, while the German yards' share of warship orders for foreign countries diminished accordingly. Just before the outbreak of the World War Krupp lost another of its most important markets, Turkey, to the Zaharoff group.

In the United States in the meantime the munitions industry had been developing along somewhat different lines. Here it was most markedly an outgrowth of already existing industrial organizations so that the typical European "armament king" was altogether absent. The numerous little blast furnaces and iron smelters that cast cannon and cannon balls during the Revolutionary War and the small local powder manufactories of the same period did not attain economic or political importance. The Civil War gave rise for a time to large scale production of war material, but no permanent munitions industry grew out of it, because the American army and navy ordered neither guns nor ships for half a generation after the war. Only when the United States began to build its modern fleet in 1886 were contracts given to big plants. Guns were ordered from the Midvale Steel Company—which later entered into bitter competition for armor plate orders as well—while guns and armor plate were ordered from the Bethlehem Iron Company (later the Bethlehem Steel Corporation). When Hayward Augustus Harvey, president of the Harvey Steel Company of Newark, New Jersey, invented the Harvey process for hardening armor plate in 1890, the Carnegie steel plant also began to manufacture armor plate. In the United States ordnance works have usually been merely departments of big steel plants. As the American interest in armament manufacture came later than it did in Europe, the process of concentration was delayed. It was not until 1913 that the Bethlehem Steel Corporation bought up a yard in which big battleships could be built even to the smallest detail.

The years immediately preceding the World

War were a period of tremendous activity for the munitions industry, as both great European alliances were building up their military and naval establishments. The outbreak of the war caused no change in this situation at first, for all countries thought they could get along with the available material or with the productive capacity of the existing plants. Not until 1915 did it become fully apparent that the war would be a long drawn out struggle, enlisting all the resources of the continent, rather than a short, sharp campaign ending in sudden victory for one side or the other. Extensive expansion of war production then began, transforming all the industries of the belligerent countries into munitions industries. At the start the governments treated the munitions industry as a private party to a contract, as had been the case before the war, but it was soon found that this newly created giant machine required new forms of organization and management, representing a cross between governmental and private ownership in all countries, and giving the state an unprecedented degree of control over production, prices and labor policies.

The munitions establishments on both sides were utterly unprepared for the tremendous demand for guns and ammunition of all kinds and for the production of the new weapons developed during the war. In the beginning Germany suffered from this shortage less than did the Allies. The German general staff was less dogmatic than the French about the length of the war and consequently had larger reserves of material. Nevertheless, Germany too lacked sufficient munitions for some months after the battle of the Marne. The high development of its metallurgical industries, however, and the care taken at the time of mobilization to retain the necessary workmen in the war factories enabled that country to begin the production of munitions on a sufficient scale some time before the Allies were in a position to achieve the same result. It was only when the allied blockade began to shut off essential raw materials and German labor began to be restive that the German munitions enterprises lagged.

France was less well prepared. By the end of August, 1914, the supply of munitions began to run short. The effort to produce on a large scale was handicapped by the fact that the Germans had occupied that part of France which was richest in metallurgic industry and by a shortage of skilled labor due to the unscientific mobilization which had taken workmen for the

army without regard to their importance to the war industries. The government immediately began to utilize governmental plants to the utmost and at the same time to set private plants to producing munitions. So well did this effort succeed that by March, 1916, France was producing ninety-eight times as many machine guns, two hundred thirty-seven times as many rifles, four and a half times as much powder and twenty-five times as much high explosive as at the beginning of the war.

England likewise entered the war with small reserves of munitions. By the terms of the French alliance its contribution was to be the British navy and a small expeditionary force. When England realized that instead of the latter it would be necessary to raise and equip an army of millions, the seriousness of the munitions problem became apparent. There were only three government factories producing munitions—Woolwich Arsenal, Enfield, for rifles, and Waltham Abbey, the royal gunpowder factory. There was also a group of private armament firms—Vickers, Armstrong, Whitworth, Birmingham Small Arms, Coventry Ordnance Works, Beardmore, Firths, Hadfields and Cammell Laird. These plants were expanded, new ones were built, and private plants which could be adapted to munitions were utilized until by the third quarter of 1918, according to the estimates of G. A. B. Dewar, there were 2,871,000 men and women directly employed in the munitions (metal and chemical) industries; including those indirectly employed Dewar puts the total at 3,400,000, and he calculates that at the period of greatest productivity there were between 8000 and 9000 firms engaged in the production of munitions.

The United States was less ready for the war than any other country involved. Before 1914 there were only six government arsenals and two large private ordnance works which were at all competent to manufacture heavy artillery. Allied orders led to some expansion along this line in the early years of the war, but even in 1917 there were only a score or so of firms turning out artillery ammunition, big guns, rifles, machine guns and other important ordnance supplies. When the Armistice was signed, however, there were nearly 8000 manufacturing plants in the United States working on ordnance contracts.

The end of the World War brought about a complete transformation in conditions within the munitions industry. The Russian industry was freed of western influence and rebuilt and ex-

panded by the Soviet government. Krupp dropped out of international competition but in 1920 it purchased the Åkers ordnance works in Sweden and since then has been supplying foreign countries with guns made in Sweden under its patents. The only plant left in Germany was the Ehrhardt works in Düsseldorf, which Krupp likewise owned for a time, but which was bought by the German government in 1929 after its expansion. The old Zaharoff group also disintegrated. The British munitions industry, which had grown powerful primarily through the mass production of battleships, suffered a serious blow in the Washington Naval Treaty of 1921-22. Vickers and Armstrong both had to be reorganized in 1925-26; in 1927 the munitions plants of both firms were merged into Vickers-Armstrongs, Ltd., with Vickers dominating the new concern. Ansaldo, which had come into prominence during the war, collapsed after hostilities ceased and was maintained only with the aid of state subsidies. Schneider-Creusot became the undisputed leader of the whole continental munitions industry. This munitions plant was expanded into the biggest industrial concern in France with large interests in production for peacetime use. The Skoda works, majority control of which was acquired by Schneider in 1919, was enlarged considerably both for munitions and for peacetime production and became a powerful subsidiary, filling chiefly the orders of the Little Entente. Energetic efforts by the Czechs to nationalize the plant failed in 1930. In the United States the Bethlehem Steel Corporation in 1923 took over its competitor, the Midvale Steel and Ordnance Company, thus obtaining a virtual munitions monopoly.

The political, economic and social problems which arise out of the munitions industry are many. Most obvious, perhaps, are its connections with national diplomacy. Support by the diplomats of its own country has always been extremely important to the industry, and it has obtained this aid regularly, although published diplomatic documents simply omit the material dealing with this subject. The monopolistic trend of the munitions plants has caused the diplomats always to aid the monopoly plant, leaving the outsider without any support. Military missions always see to it that armament material produced in their own country is purchased by the government to which they are accredited. The sovereigns have also carried on vigorous propaganda for their munitions plants.

Wilhelm II took a lively interest in having Chinese war-ship orders filled in German yards and personally intervened with Czar Nicholas II for the award of Russian warship construction to Germany.

In spite of this close connection with national diplomacy, the munitions industry recognizes no national boundaries. It will sell to anyone who will buy, whether the purchaser be an ally of its home government or a potential enemy. Hans Wehberg declares that in 1915 the English troops in the Dardenelles were defeated by artillery which the Turks had bought from English armament firms. Lehmann-Russbüdt states that "the Krupp works, in the course of a century, exported one-half of its total output of cannon to fifty-two countries which later, during the World War, showered hand-grenades and death-dealing shells on the Germans and their Allies."

The diplomatic relations of the munitions industry are not, however, the only source of the social problems of the industry. Its influence in domestic politics is important also. While the use of lobbying and the exertion of economic and political pressure by munitions makers may not be much greater than similar activity on the part of other industries, the distinctive nature of the armament business makes it a more vital social problem. It does not remain within the purely business sphere, bringing economic distress to classes which are less able to influence the government; it makes its profits partly through speculating on mass slaughter and partly through the slaughter itself. The profits of the individual munitions plants are in startling contrast to the general destruction of values caused by the products which they manufacture.

Appropriations for armaments are often voted, not in the interests of the state as a whole but in the interests of one or more groups. The munitions industry obtains its orders therefore not as a result of the general governmental concern for a national foreign policy, but in consequence of a definite distribution of social and political power within the state. Thus the expansion of the German fleet around 1900 did not have any motivation in foreign policy but took place before any opponent for the fleet had been found. The navy laws of 1898 and 1900 were part of major political and economic conflicts between heavy industry and the big agrarians, who ultimately granted each other a fleet and protective tariffs, coming together for a joint suppression of the social democracy in-

stead of contesting with each other for governmental power.

Particularist interest in expansion of armaments may go as far as in Japan, where naval construction was pushed after 1910 by the business men and industrialists of Osaka and Kobe, by the Zaharoff group, which paid fantastically high bribes, and finally by high navy officers of the Satsuma clan—including Admiral Yamamoto, the prime minister—who were financially interested in the Mitsui works in Nagasaki.

Another problem arises from the fact that the munitions industry does not wait until the interests of the ruling classes provide it with orders; it endeavors to regulate the armaments of the great powers in accordance with its own economic ambitions. Statistics on the number of articles on naval matters appearing in American newspapers indicate a rapid rise during periods of falling iron and steel prices and low shipyard activity, while these articles grow fewer as prices rise and prosperity returns to the industry. When the crisis commenced in Germany after the second navy bill had been passed in 1900, the president of the German navy league, Prince Salm-Horstmar, appealed to Admiral von Tirpitz for a new navy law, because "orders for new warships and the ensuing stimulation of trade and industry would cause the corresponding stock quotations to rise, saving many securities and consolidating the market." In England, after the business crisis of 1907-08 when Germany speeded up naval construction by building four big ships annually instead of three, while British dropped from four in 1906 to three in 1907 and two in 1908, the Zaharoff group and the Coventry works initiated a large scale press campaign, attempting to prove by bold distortion of figures that Germany would soon have more dreadnoughts than Britain. As a result they actually succeeded in having eight dreadnoughts built in 1909. But since the Coventry works out of all this booty was awarded only the gun contracts for a single ship, it was forced in order to avert financial collapse to have its banks grant loans to Australia and New Zealand so that they might order two additional battle cruisers.

This problem arises not only in time of industrial depression but is necessarily bound up with the existence of a private munitions industry working on government orders. Its production depends on two contradictory factors: the industry's interest in accurate cost accounting of production and of capital charges, with uniform

production to reduce costs; and the government's interest in the greatest speed in handling its orders, a number of which are usually awarded at one time. The state requires very short delivery dates in war, but even in peace time new inventions in armament technique result in mass orders for rapid delivery, while there follow long intervals when there are no orders. Thus the munitions plants are forced to expand greatly, while they also endeavor to keep the plants in operation at all times. This leads inevitably to the exertion of constant pressure upon governments to award new orders.

The physical location of munitions plants also has economic and political implications. If they grow out of plants producing material for peacetime uses and still manufacture such products as subsidiary or major output, they must have good industrial locations to enable them to compete successfully. But as munitions plants they cannot take this factor into account; they must be located well away from the frontiers so as not to fall into the enemy's hands in the event of invasion. In spite of their prominence, however, as objects of attack munition centers have never played more than a minor role in strategy. Moltke gave the subject some thought in 1870, but pre-war continental military thinking eliminated munitions centers as objects of attack by concentrating upon rapid and brief operations at the beginning of the war and quick military decisions on the field of battle.

The League of Nations has endeavored to reduce the influence of the munitions industry in politics, but with slight success. The Chinese arms embargo of 1919 was never effective; nor was the St. Germain Convention that no arms would be supplied to revolutionaries. On the contrary the revolutions and undeclared wars of the post-war period have led to a further strengthening of the munitions industry. The Arms Trade Convention of 1925 was signed but never ratified by the required number of countries; and no country is ready to injure its balance of trade by eliminating arms exports. Publication of arms import and export figures is of merely academic interest; the statistics list numerous exports that have never reached the country of destination as well as imports that were never exported from the alleged country of origin. The munitions industry itself is tenaciously fighting any limitation of armaments, especially naval armament, as was brought out in the Shearer case; it would not be much affected by numerical reduction of land forces,

as even small armies require large material reserves in order to expand to war strength.

ECKART KEHR

See: ARMAMENTS; ARMS AND MUNITIONS TRAFFIC; NATIONAL DEFENSE; MOBILIZATION AND DEMOBILIZATION; WAR ECONOMICS; MILITARISM; LIMITATION OF ARMAMENTS; NITRATES; CHEMICAL INDUSTRIES; IRON AND STEEL INDUSTRY.

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