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AMERICAN IMPERIALISM MAIN DRIVING FORCE FOR WAR

August 9, 1945 - Another phase of the imperialist war seems to be drawing to an end. The continuing naval and air victories of American imperialism against Japan, the utilization of the frightful atom bomb, and now the entry of the Soviet Union into the Eastern war, evidently seals the doom of Japanese imperialism. The "man on the street" and the average worker in uniform is elated that the bloody years are about to come to an end.

But there are some disquieting factors in this picture. Major General Hershey, selective service director of the United States, says that 100,000 men per month will be drafted AFTER Japan is defeated. The American Army reports that it intends to keep a force of some seven million men until June 1946 at least. The American occupation forces in Germany are building more and still more air bases. At least 2,500 bombers are to be kept for "policing purposes" in the American section. Why 2,500 bombers are needed to police an area of 15 million helpless people already policed by a few million troops and why new airfields are needed is something that no government official cares to explain.

The war is not over! It may undergo several changes in form and sometimes in content but the war is not over by a long shot! Revolutionary Marxists must re-emphasize a number of simple fundamentals to get a clearer picture of international events.

ATOM BOMBS

Parentetically it may be remarked that the atom bomb far from ending wars because it is so devastating, in fact offers an opportunity for a much bloodier and more sustained warfare. For the principle behind the atom bomb can also be used in completely modifying the use of the airplane. It is quite conceivable that science will soon perfect an atom anti-aircraft shell which will destroy all planes within a radius of many miles. Such a development will considerably alter the effectiveness of the present airplane, in favor of rocket devices and other long-distance (but as yet none too accurate) inventions. Scientific discoveries can alter the tactics and strategy of warfare, but only proletarian revolution can end wars as such. Not even the terror of a bomb that kills 150,000 people in one second can stop the capitalist madness from continuing such bestiality.

LONG TERM PLANS OF U. S.

Prior to the present war we made two fundamental observations relative to the role of the United States in world affairs:

- 1- That the economic needs of American imperialism make it the main driving force for imperialist war; and
- 2- That in order to survive (even temporarily) American imperialism must dominate the whole world.

The Roosevelt government, even as far back as 1933 set about methodically to accomplish these tasks. And if you check closely you will find a striking parallel between the Roosevelt strategy and the Hitler strategy. The major difference between the two lay not in the brainwork of either imperialist

puppet, but in the fact that behind Roosevelt stood a much more powerful economy. But both governments set about to do a number of things:

First - to reorganize home economy and to straitjacket the proletariat in preparation for the war. Because the German economy was much weaker Hitler had to use more force against the masses than Roosevelt, but the essential objective was the same: to tie the working class into the imperialist war machinery.

Second - to destroy one enemy at a time, to fight a one front war as much as possible. For a long time Hitler was able to achieve this purpose. He utilized Stalinism in the struggle against France and the Low Countries. He tried with might and main to avoid war with the United States until the Soviet Union was completely defeated and German imperialism could re-organize the whole European continent for the smash against the American colossus. At this point, however, the Hitler strategy bogged down. He underestimated the strength of transition economy in the Soviet Union.

ONE ENEMY AT A TIME

American Imperialism, however, has a similar strategy: beat one enemy at a time. There are no such things as "allies" in the modern imperialist world. An "ally" is merely an enemy who is temporarily neutralized or who is the least dangerous of two or more enemies at the moment. The long-term strategy of Uncle Sam can be divided generally into five sections. That does not mean that America must use force in every situation - there are economic, diplomatic and other weapons that can reduce a weak power to imperialist insignificance. But by and large the big military stick is the decisive instrument. The five sections of American strategy are:

- 1- Defeat Germany, the most aggressive and ambitious imperialist power other than the U. S. At the same time attempt to undermine the Soviet Union and to weaken all other "allies" (France, etc.) and particularly the British Empire.
- 2- Defeat Japan and establish the Pacific as an "American Lake". Such a victory will give the U. S. control over the lives, destinies, and economies of Asia and its enormous population.
- 3- Smash the developing Proletarian Revolution - first by utilizing social reformism to undermine the struggles of the European (and Asiatic) masses, and then by the outright use of force. American Imperialism is now in the first phase of this strategical onslaught. All through Europe it is utilizing Stalinism (and to a lesser extent, the Socialists) to weaken the pillars of independent working class action. American troops are playing the same counter-revolutionary role today - only on a vastly expanded scale and with much greater resources - as that played by Marshall Foch and his innumerable satellites (such as the Czechs, Rumanians, Denikin, etc.) following the first World War. Whether the American workers in uniform can be kept playing this role is the big question mark in international politics.
- 4- Defeat and smash the Soviet Union as a warped Workers State and as a gigantic source of markets and spheres of influence.
- 5- Defeat and destroy the British Empire.

JOB ONLY PARTLY DONE

As can be seen from this schema, American Imperialism has only accomplished a

part of its task. How quickly it proceeds to the third, fourth and fifth stages depends on quite a few factors. Wall Street, like Hitler, would like a breathing spell between each part of its struggle in order to consolidate its economic gains and to adequately prepare for the next stage.

In a sense the present period offers a partial breathing space. America is now busy doing in Europe precisely what the German imperialists did before it; reduce the European economy to an essentially agricultural economy. Reports emanating from the continent indicate that the masses are being scientifically starved to death, just as they were under Hitler. The whole city of Vienna is subsisting on bread alone, according to the writer M.W. Fodor, and hundreds of thousands face imminent starvation. Germany is living on a diet of 1150 calories per day, little more than one good malted milk - and in many instances the diet runs even lower than that. French and Italian production is way below what it was under the Nazi overlords. Coal production throughout Europe - which is a good barometer - is not even enough to heat the homes of the populace let alone to run the factories. Coal production in the Ruhr, at one time, was only 10% what it was under the Nazis. The Potsdam conference of the Big Three emphasized this trend of events. Germany is to be stripped of billions of dollars worth of industrial equipment - and Germany has always been the hub of European economy. The Potsdam communique openly stated the avowed purpose of making Germany an agricultural country. But such a task can only be accomplished at the cost of millions of lives. The poor soil of the Reich can not sustain the people except on a greatly reduced standard of diet; and if the great chemical and other plants should be put out of business German agriculture would be deprived of adequate fertilizer and adequate farm machinery to even produce a minimum.

FOUR POWERS SMASHED

Of the six major imperialist powers in 1939, America has now reduced to impotence four - Italy, France, Germany, Japan. It has gained a powerful foothold in Europe and Africa; it has enormously consolidated its control over Latin America and Canada; it has sprouted like a mushroom throughout Asia; and has extended its influence greatly even into the British Empire. But the tasks of American Imperialism are not yet completed. We repeat - the war is far from over. It may have a short interlude, but it must continue later on an ever greater scale. For - to exist - American Imperialism must conquer the earth and must destroy this wave of proletarian revolution.

The war, far from alleviating the difficulties of American Imperialism, has in fact accentuated and increased them. The effects of war time economy changes are at present only beginning to be felt in the domestic scene; but they will soon be translated into international language of struggle for markets and spheres of influence. We are beginning to feel unemployment, cutbacks, re-conversion difficulties, reduction of the 199 billion dollar yearly national income. America is overloaded with liquid capital (24 billions in gold alone, besides dozens of billions in credit money) for which it needs an outlet. By altering the American economy from a 70 billion dollar one to a 199 billion dollar one, the potential overproduction of American industry becomes a staggering one. America must soon have more idle men, more idle machines than the rest of the world combined. The NEED for dominating the whole world economy is many times greater today than it was five short years ago.

Such a need can only be appeased by the reduction of the rest of the world to mere agricultural status, to be fed finished products by the great American factory machine, and the enormous reduction in the already low standard of living of the oppressed masses of the world.

No wonder then that America needs 7 million men in its Army this coming year! The pauperization of 2 billion people obviously needs a gigantic police force (army of counter-revolution). The imposition of military and fascist dictatorship, which Wall Street hopes to impose after social reformism in Europe and Asia has sufficiently confused, demoralized and divided the oppressed of these lands - the imposition of such dictatorships alone require many millions of men.

SOVIET UNION AND JAPAN

In that respect it might be well to re-emphasize that under Stalinism, the resources of the Soviet Union, are being drawn into this shameful counter-revolutionary venture. Stalinism is agent number one for Wall Street's attempt to maintain "law and order", to keep capitalism. The present declaration of war against Japan by Molotov was one of the most disgraceful acts in all history. It pictured the American and British imperialists as "peace-lovers" and the Japanese imperialists as a bar to world peace. By so deluding the masses of the world who follow Stalinism, the Soviet bureaucracy helps to prolong the war and aids those who are at this moment (even while "allied") planning the steps for intervention into the Soviet Union as well. By aligning itself with American imperialism in the struggle against Japan it is aiding to keep in check the revolution in China, India, and in Europe. It is playing the most treacherous role of any force within the labor movement in all history. It is multiplying the crimes of Noske and Scheideman a thousand fold. A political revolution in Russia against Stalinism is part and parcel of the broader struggle for a world proletarian dictatorship. One can not succeed without the other.

WAR NOT OVER

It must be admitted that so far world imperialism has won one victory after another against the working class. The continuation of its war without any major successful Proletarian Revolution is testimony to the fact that the imperialists - particularly Franklin D. Roosevelt - planned their CLASS war with utmost meticulousness. Without the smashing of the Spanish Revolution; without the mustering of the American working class, with the aid of CIO Labor Skates, the Stalinists, and the Labor Party advocates (The Trotskyists and others) who constantly tied the working class to the Roosevelt tail - without this long term perspective the present victories of Wall Street against the world working class and against its own imperialist rivals would have been impossible.

But the last word has not been written on the present bloodbath. The explosive force of starvation, hunger and death which Wall Street has set in motion will yet prove to be a million times more powerful than that "noble" achievement of decadent science, the atom bomb. American imperialism - the main driving force for war - has only hurdled two of its five major obstacles. The other three hurdles are fraught with infinitely more danger to the capitalist system of exploitation.

A proletariat led by an International Revolutionary Marxian Party - a New Fourth Communist International - which points out the pitfalls especially of bourgeois democracy and of reformism can and will end war forever. All other roads lead

merely to the destruction of the human race.

ONLY PROLETARIAN REVOLUTION CAN END THE WAR! ONLY A SOCIALIST SOCIETY CAN AFFORD PEACE.

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IS THERE A MILITARY SCIENCE?

There are some accepted concepts that have no relation to facts. One of these is military "science". Whether warfare is a science has been questioned off and on, over a long period of time. But like the priest and religion, the military caste has its special interests and is able to do a capable job of suppression of the dispute.

When Du Picq, a famous military man of some standing, tried to gather the facts of war and to formulate this science he discovered that these facts were unknown. Likewise the famous French General, Maurice de Saxe, the so-called illegitimate son of the King of Poland, wrote his works on the art of war and denied that there were any military principles.

In spite of these assertions practically every book written on war and military problems, from the most ancient to the most recent speaks voluminously about military principles. You cannot pick up a book on military problems without encountering the term "principle" throughout the book: principles of this and principles of that. But merely to label this or that a principle does not make it a principle. Facts must be stated and proof given. Furthermore, no two writers of military problems agree on what a principle is and what it is not.

A review of this question will confront a contradictory and confusing picture, even though almost every one of the books contains some valuable information on the question of war and military principles. But this does not settle the problem. The theoretical question of principles and military science must be taken out of this kind of material and settled on a broader plane, backed up by facts and not by fancy.

If there are military principles than there is a military science. It may be that due to the fact that the science is in its "infancy" there is confusion and all that is needed is agreement on what constitutes the principles. But on the other hand if there are no military principles, than there is no military science.

TROTSKY'S POSITION

Trotsky had a definite position on this question and stated it in no uncertain terms in the arguments regarding the building of the Red Army in the twenties, just before Lenin's death. Trotsky said, "The Marxian method is a method of historical and social science. There is no "science" of war and there never will be any. There are many sciences war is concerned with. But war itself is not a science; war is practical art and skill. How could it be possible to shape principles of military art with the help of Marxian methods?" "It is as impossible to create a theory of architecture or to write a veterinary textbook with the help of Marxism." (How the Revolution Developed. Its Military Power-Moscow 1924).

Trotsky continues, "Furthermore, even if one should agree that 'military science' is a science, it is impossible to assume that this science could be built according to the method of Marxism."

"Historical materialism is by no means a universal method for all sciences..."
 "To attempt to apply it in special domains of military affairs would be the greatest fallacy" (ibid). This argument was delivered in the debate against Generals Frunze and Voroshilov at the second Congress in 1922. No one can question the military ability of Trotsky nor that he was a capable Marxist for a goodly period of his political career.

We will have to go deeper into the problem to shed light on this question. Before that, however, it may be well to point out an important theoretical error of omission in Trotsky's statement, not directly related to the question of a military science as such, but indirectly related to the whole problem of war, military problems and men who wage them.

Trotsky speaks of the limitations of Marxism, no matter how exact it is in its own realm. Without stating the relation of Marxism (Historical Materialism) to a more fundamental problem of science, this error of omission leaves an entirely wrong impression upon the question of military problems and science. In the first place, as Trotsky correctly says, "The Marxian method is a method of historical and social science." As such it has a bearing upon the problem at hand. War and military action are problems primarily of man, of society, and not basically, of some other sciences which deal with organic or inorganic research. And since Marxism takes up the historical and social sciences, guided by the theory of historical materialism and the class struggle, the question of war is a part of this problem. For the history of society is nothing more nor less than a history of class struggles as the Communist Manifesto so clearly pointed out.

But more important than this error of omission by Trotsky regarding this theoretical question was his error in not properly connecting up and explaining the relation of Marxism to Dialectical Materialism. Marxism is only a PART of dialectical Materialism. Marxism is the application of Dialectical Materialism to the field of economic and social problems.

Dialectical Materialism is THE theory of knowledge and is the scientific method of reasoning and investigation. It is true, as Trotsky states that Marxism can not be applied to these other sciences. But this is true only insofar as the principles of economic, social and class problems are concerned. It is not true insofar as the fundamentals of dialectical materialism are concerned. Dialectical materialism can be applied to all fields of investigation, even though each field of research will unearth, will develop its own internal "laws" or principles. Such "laws" or principles are concretely related to the specific fields of mass in motion under consideration.

If Marxism, and dialectical materialism are taken in this light it throws new understanding upon the problem. It by no means means that Trotsky's viewpoint is false. It means that within this larger framework, Trotsky's position has both factual and false relations. Part of his statement is correct, but only in a certain larger relationship.

ELASTICITY IN STRATEGY

Trotsky correctly warned against dogmatic concepts of strategy. Napoleon like wise had no cut and dried strategy and tactics for battle. Trotsky advocated elasticity for the Red Army due to the transitory condition it lives under. A worker's state, in a backward country, isolated and surrounded by higher

developed capitalist countries, yet with a higher social system than capitalism - with a permanent struggle in one form or the other between capitalism and the Soviet Union - for such a variable situation variable tactics and strategy must be worked out. The Hitler attack on the Soviet Union, the defensive moves and then the offensive moves by the RED ARMY vindicate Trotsky's main contentions on the problem of strategy and tactics.

The science of Dialectical Materialism CAN be applied and must be applied to military problems if a scientific understanding of warfare is to be obtained. The application of science, of dialectical materialism, does not imply that the subject investigated must become a science. A scientific understanding of the military does not necessarily equal military science. This distinction is not a bit of dogma, but of the utmost importance for working out proletarian military strategy.

SOCIAL PROBLEMS AND WAR

Textbooks on war, speaking of "principles", in reality refer to strategy and tactics. The real underlying principles of military problems and war are the social problems of classes and state power. Clausewitz, who stated that war is merely the continuation of politics by other means, presented within this statement the germ of "military" principles. But he did not develop this concept beyond this stage, true as it is. War as a continuation of politics by other means reveals the direct, close and organic relation between politics and war, class war, imperialist war or wars of colonial liberation.

The principles of war as a "continuation of politics by other means" are to be found in the principles of society, of classes, and in the question of state power.

Let us break down the question of military problems in its different parts to get a clearer picture of the question before us.

The strategy and tactics of war must first be "isolated" from its more important subject matter - principles - and then considered in the light of historical development and, then again, put back together in the proper relation to man's actions in class struggles.

First to isolate strategy and tactics of war. Principles are the overall questions which govern and determine strategy and tactics. But military struggles have developed no principles, have no principles which we can call part of the military set-up. The governing principles of military strategy and tactics are the CLASS PRINCIPLES of the different classes involved. The question of the defense of class interests, of state power, the seizure, maintenance or overthrow of state power of others, are the determining factors and the principles which determine military strategy and tactics.

The revolutionary Marxists have presented several important principled questions for the working class interests which determine the strategical and tactical problems of class war, in "civil peace" during imperialist war, and in civil war. Other classes, exploiting minority classes, have their principles also revolving around their class interests and their state power.

In this respect and this respect only, principles which determine military

strategy and tactics comes under the head of Marxism, under the head of historical materialism as a part of dialectical materialism. But these principles are NOT military principles. These principles are principles of class relations, of economic and social factors.

CONSTANT AND RELATIVE FACTORS

So far we have dealt with strategy and tactics only from the theoretical standpoint of (a) actual war, and (b) its historical development in relation to economic change. We find that strategy and tactics have certain constant factors which seem to transcend classes and class interests, and even technological development.

In dealing with certain aspects of strategy and tactics we find that there is a rhythm not for a hundred years but for thousands of years. This does not mean that one can rush into battle with preconceived strategy and tactics. Such will lead to sure defeat. Each battle, each campaign and every war has its own strategy and tactics. What we mean by this statement is the following: that there are certain factors which are constant in relation to strategy and tactics but one cannot tell in advance which to use in battle until one is actually in battle and can judge if this or that strategy and tactic fits the concrete situation.

A crude example is the problem of a skilled boxer. He must learn all the strategy and tactics (using the term in a limited sense) of boxing; all the defensive and offensive combinations of arms, feet and brain. But naturally the capable boxer that wins does not go into the ring with a set pattern. He knows the 'rules by hand' and he knows in a flash which to use for each concrete situation that he confronts from minute to minute. So too, on a gigantic scale is the same true in the military sphere with reference to tactics and strategy.

What is the red line running through strategy and tactics that makes for continuity over many many years even extending into different social systems? What is this constant factor, referred to as historical? It is the question of the relation of different forms of matter in motion, of different kinds of material and men in motion against other material and men in war. It is the question of utilizing the most, the best, and the fastest in men and material vs the enemy. No matter what stage of economic development or social system, for the concrete situation, it is the most, the best and the fastest that counts in the long run; and above all the ability to reproduce it as fast as the previous batch is destroyed.

Matter in motion, in the form of material and men (in quantity and quality and speed) takes on certain "rules" or laws" in offensive and defensive relations. These are the "constant" factors of strategy and tactics.

At the same time and as an integral part of strategy and tactics there exists the relative factors. The relative factors of strategy and tactics change rapidly from one level of economic development to another, from one social system to another, from one war to another. And if the military caste does not keep abreast with these changes it will be out-manuevered.

For example, the French, British and American General Staff did not keep abreast with the underlying factors which caused the strategy and tactics to change in the second world war. True, Mitchell, De Gaulle and others did, but they were not listened to until the Fascists had almost overrun the earth. Germany and the Soviet Union understood the lessons of the Spanish Civil War. They learned from it. Their action in the second world war proved this. It took United States and England the hard way to learn these strategical and tactical lessons.

In the concrete, these lessons deal with air power and tank power and a new relationship of land, sea and air power. The speed now developed, the space now covered, brought into play new relations of tactics and strategy that under former slower conditions were suicidal.

But what were the underlying relative factors? It is the question of scientific development of technology, in short economic development. Economic, because it is not just the ability to produce the new. It is the economic ability to produce the new in mass quantity in the best quality--with speed, economically and for purely military use.

Every time there is a technological development and the economy of the nation can absorb this in its productive capacity and as a social condition, this development has a direct bearing upon military tactics and strategy. Especially such things as airplanes, machine guns, radio, radar, giant tanks, airplane carriers, medical discoveries to reduce the number of disabled or killed from wounds new ship and air motors, jet planes, rockets, and a thousand other things.

Each time new economic developments transform the relations within and between strategy and tactics the army of military writers speak of discovering new "principles", new methods of warfare, etc. But these strategical and tactical problems, of constant and relative relations, are at all times subordinated to the principles that have their roots in the economic system of society and are expressed by class and state interests.

Therefore we can conclude that although science must analyze and understand not only the cause of war, the war itself, but also its motion in strategy and tactics, there is no military science. War as a continuation of politics expresses the principles and science in the political, economic and social relations.

The struggle of employers and employees that breaks out into strikes represents a form of the class struggle. But this does not mean that there is strike science anymore than there is a military science. True one must study war and its strategy and tactics just as capable working class labor representatives study and know what is best in strikes. But to understand the overall of strikes or of wars one must understand the social principles, the social system and class relations behind the strikes and behind the military action.

THE STRUGGLE OF MAN AGAINST NATURE

Many who are proficient in the application of the Marxian method to the class struggle are prone to overlook entirely or to distort its application to the struggle of man against nature. This struggle predates the struggle between the classes; it existed long before the dawn of the species known as man. Moreover it continues at the root of all technological developments in class society, and, far from coming to a close with the termination of the class struggle, will only then be carried on with man's undivided energies.

Most common of the distortions to which some Marxists fall prey in this sphere is that of "nature cure"; roughly, the concept that man cannot improve on nature in the healing of diseases. There are a number of variants to this basic fallacy; but we are more concerned with a theoretical exploration than a point by point refutation. Hence only such dogmas of "nature cure" as fit into our more general positive examination will be dissected.

Man's struggle against nature in early history is a pitifully weak one. He makes use of "magic"; he recognizes nature as a higher, but anthropomorphic, power. Consequently, he alternately threatens or bribes nature; he appears at her shrine as a humble suppliant. The hundreds of generations that slowly pass as man painfully learns the secrets of nature and makes use of them for his own ends reveal the antagonistic character of man himself; on the one hand he is himself a part of nature - the two legged mammal with opposable thumb - the tool-making animal; on the other hand he stands in opposition to nature. In proportion as man develops a differentiated social organization based on private property, he develops a more and more intense need to oppose nature. This opposition now becomes a social and not an individual phenomenon.

The primitive man who subsisted on hunting, fishing, and occasional wild plants obviously lived almost completely at the whim of nature. To put it loosely he was in an almost completely objective relation to nature: all, or virtually all his acts were merely physiologic or "instinctive" reactions to stimuli. The history of man's technological development includes within it the history of man's increasing subjective relation to nature. He observes a regularity in some natural phenomena and MAKES PLANS based on this regularity: e.g., the flooding of the Nile, the succession of wet and dry seasons, the alternation of summer and winter, the phases of the moon, the motions of the planets, the recurrence of dark and light, etc. We do not propose here to enter into a detailed catalogue of these most important phenomena (ones which man earliest planned on). Suffice it to say that under modern capitalist technology, this subjective relation has gone much further than mere planning on the regular recurrence of phenomena.

One of the most salient characteristics of modern technology is its deliberate intent to intervene in natural phenomena instead of merely PLANNING on such phenomena. Man today alters or completely changes the effects of many phenomena. Thus he makes machines which counterpose man made forces to the gravitational force and make air flight possible. It should be noted that man has not defied the law of gravity; he has intervened to counteract its effects. Similar examples can be adduced in the entire field of mechanics.

Narrowing our field somewhat, we wish to consider some aspects of modern agri-

culture - a technological field whose scientific investigation is little more than a hundred years old. Man knew and practised the three-field system, rotation of crops, manuring of soil, long before the nineteenth century. But these were almost haphazard applications of empirical observations until the time of Liebig. Liebig first put agriculture on a theoretical basis by studying the nutritional requirements of the plants, the chemistry of the soil, etc. Man developed fertilizers with specific ingredients to replace what was specifically deficient. He was able to calculate how many pounds of calcium per acre a given soil would need to raise a given crop, or to increase the yield on that crop.

Man has developed scientific feeds for cattle to increase the meat supply, or the milk supply; he has improved poultry similarly. He has learned to use parts of the animal which were formerly wasted; he has learned to extract valuable oils from the cotton-seed which used to be worthless; he has learned to extract sex hormone from mare's urine. He has learned the laws of genetics and has created artificial crosses with properties unlike those of the ancestors or combining the best features of the ancestors. His hybrid corn, for example, is so much sturdier and better than the old corn stocks that it has almost completely replaced the older product. He has created new fruits and vegetables; he has bred strains of plants resistant to diseases; he has learned what chemicals can be sprayed on plants to check other diseases or insect enemies.

One of the most significant developments in this respect is what is known as hydroponics: the soilless growth of plants. Seeds are developed and plants grown in solutions of various chemicals which supply all the nutritional requirements of the plant. This development, less than ten years old, threatens to complete revolutionization of many branches of agriculture.

One of the most far-reaching advances man had made in the biological sphere has affected not merely scientific crop-growing, but also food technology, and preventive and curative medicine. We refer here to the field of bacteriology. In the domain of agriculture, the most important advances in which bacteria showed the way are in the field of nitrogen fixation. Certain bacteria have the ability to take nitrogen from the air and convert it to nitrates, which are necessary for soil enrichment. These bacteria are associated with leguminous plants. Hence it becomes possible to enrich a nitrate-deficient soil by planting legumes for a season or two.

Again, numerous types of bacteria have tremendous economic value in the production of various chemicals and foods. Thus the most economical way of producing amyl alcohol, butanol, and acetone is due to Ghaim Weizmann's discovery of Clostridium acetobutylicum, a species of bacteria which converts starch into these products. Similarly the fermentation of sugar by Aerobacter aerogenes produces 50% or more of 2,3-butylene glycol, essential for the butadiene used in synthetic rubber. Bacterium acetoethylicum, discovered in 1919, produces acetone and ethyl alcohol. All the commercial lactic acid is prepared from molasses, etc., by fermentation with Lactobacillus. Many cheeses depend on carefully selected strains of bacteria for their flavor, e.g. Swiss cheese depends on Propionibacterium, almost all cheeses rely on Streptococcus lactis for the initial souring of the milk, etc. Vinegar is produced by the bacterial fermentation of the alcohol in wine or hard cider, the process depending on the genus Acetobacter. So important are these bacteria economically that a large number of strains of bacteria are the subjects of patents.

But, just as there are economically advantageous bacteria, so there are economically disadvantageous bacteria (we speak here solely from the standpoint of man as a social animal). Acetobacter will ferment wine against man's wishes as well as in response to his intentions. Milk is soured, butter turns rancid, foods decay, etc. Most of our attention has been centered on one striking sphere of harm wrought by bacteria - disease in man. It is noteworthy that the "germ theory of disease" originated not with man but with plants and animals. Diseases of the grape were traced to certain bacteria; certain diseases of cattle were similarly found to depend on the presence of bacteria of different species. Finally the same condition was found to be true in man. No scientist ever claimed that ALL diseases were caused by "germs"; the best scientific formulation of the problem was made by Koch, whose famous "postulates" required:

- 1) A certain specific organism must be found and isolated from every case of the disease
- 2) The organism must be grown in "pure culture" - i.e., free from all other species of bacteria.
- 3) The inoculation of bacteria from the "pure culture" into a body not showing symptoms of the disease must produce the disease.
- 4) the same species of bacteria must again be isolated from the new case.

It is noteworthy that many species of bacteria can be grown on chemically pure media. Many of the pathogenic species require proteins, etc., for their culture. In no case has it been shown that diseased tissues are necessary for the culture of any pathogenic organism. Indeed, it appears in most cases to be the metabolic products of the bacteria, rather than their "stealing" of food from the organism they inhabit, which cause the disease. These metabolic products will, in turn, generally inhibit growth of the bacterial colonies unless they are removed.

Contrast these findings of scientific research (Cf. especially An Introduction to Bacterial Chemistry, by C. G. Anderson) with the arguments of the "nature cure" idealist. The Beauchamp school, for example, has never given up its blind belief in the spontaneous generation of bacteria from pathological tissue. A scientist can hold a theory that is subsequently demonstrated to be erroneous. In this sense it is the fruits of the theory which measure its value. But no real scientist can maintain a "theory" long after it is demonstrated to be erroneous. For us this technical demonstration is of no concern here. It is enough to demonstrate the hopelessly idealistic concept that you can't improve on nature.

Let us take as an illustration, the school of Chiropractic. In its most developed form, this school claims that all disease is due to the interruption of the flow of "Innate Intelligence" (god inside man, as opposed to the all-pervading "Universal Intelligence", or god outside man) along the nerves to the organ affected. Chiefly, the argument runs, the interruption occurs in the displacement of vertebrae, this causing pressure on the spinal cord, or on the nerves emanating from the spinal cord. Specific diseases are caused by specific displaced vertebrae. The cure consists in various manipulations of the vertebrae to cause their return to normal position.

What's wrong with this theory? To begin with, it rests on an idealistic physiology, rather than a materialistic physiology in consonance with the known chemistry

and biology of the organism. It ignores the multitude of pathological conditions induced by deficiencies (in part hereditary, in part nutritional) and overcome by replacing the deficiency. Cf., for example, the entire field of vitamins, hormones, blood plasma, blood serum, whole blood transfusions, etc., etc.

Further, medical science has its heroes who voluntarily contracted diseases in order to make scientific study possible. Why has no repudiator of the "germ theory" come forward to accept inoculation with blood containing the syphilis spirochaete, if he is so sure germs do NOT cause diseases?

So far we have noted that medical science does not claim the germ as the cause of all disease. It recognises deficiency diseases, parasitic diseases, diseases attributable to one or another specific chemical abnormality (e.g., diabetes mellitus, in which the glucose ingested is not converted to glycogen and stored in the liver). The discovery of chemicals with more or less specific action has resulted in enormous improvements in such conditions. Thus any tendency to glucose formation in the diabetic is overcome by prompt administration of insulin.

It is noteworthy that the drugs used in treatment or prevention of disease have their own history. In the first homeopathic stages of medical treatment the effort is to duplicate what is lacking in the body. The specific biological extract is administered. But sooner or later the pharmacologist investigates the precise nature of the drug's action. Then he experiments with other chemicals, more or less similar to the biological product. In most cases it is found that the most effective drug is that found in nature. But in a number of cases, startling improvements on nature have been developed. Thus diethylstilbestrol and hexestrol have the same potency and specificity as estrone, the female sex hormone, and are both much more readily available. Neither is found in nature in any form. Similarly, the war-created shortage of quinine has resulted in the development of synthetic anti-malarials (plasmochin, atebrin and others) which will undoubtedly supplant quinine in the future.

The development of sulfa drugs is a startling example of chemotherapeutic action. Here again there is nothing in nature similar to these synthetic compounds derived from the coal tar compounds of by-product coke ovens. But perhaps the most interesting phase of the whole problem of chemotherapy is in the recent development of products of the metabolism of micro-organisms as bactericidal agents. Penicillin (from molds) and gramicidin and streptothricin (from different species of bacteria) are toxic to certain types of pathogenic organisms but not to the host. It appears that there can be no such thing as an overdose of penicillin from the standpoint of harm to the recipient.

From the standpoint of human society such improvements on nature are extremely beneficial, as are the anesthetics which medical science and chemistry have also developed. No claim is made that these improvements can come to full flower under capitalist society. Quite the contrary is true. Precisely because of the private ownership of the means of production, many products are withheld from use or are misused. Because of the capitalist interest in deterring birth control and illegalizing abortion, the working class suffers. Because there is more profit to be derived from injection of estrone (which the patient cannot take by himself orally), the substitutes diethylstilbestrol and hexestrol are withheld from the market (they can be taken orally, thus cheating the doctor of

his fee). But we think our main thesis has been adequately demonstrated: man has improved on nature in the cure and prevention of disease. That this struggle against nature will be carried on on a far higher plane once the class struggle of man against man has been eliminated by the overthrow of the capitalist system and the inauguration of a socialist system goes without saying.

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