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SOCIALIST RECONSTRUCTION AND THE STRUGGLE FOR TECHNIQUE

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SOCIALIST CONSTRUCTION AND THE STRUGGLE FOR TECHNIQUE

TECHNICAL PROPAGANDA AND ITS ORGANISATION

The proletarian revolution in our country has entered a new phase—the phase of *technical* revolution, which really emphasises its unfathomable depth. In October, 1917, the state apparatus of the bourgeoisie was destroyed, and the dictatorship of the workers supported by the peasants was organised; a process of economic expropriation of the former ruling classes then developed rapidly, together with the organisation of War-Communist social economy; the New Economic Policy, introduced in 1921, inaugurated "the period of restoration," in which our soviet economy, as evidenced in gross production, was raised to its pre-war level, but with the further gain of a developed socialist sector in the general sphere of national economy. The growing contradictions of the NEP led, in the process of reconstruction which then commenced, to a new phase, characterised by the liquidation of the kulak, the enormous growth of collective and state farms, and extraordinarily rapid and intensive industrial construction. This "epoch of great works" called for the fundamental reconstruction of the *technical* foundations of society; the problem of so-called "basic capital" or "socialist accumulation" became not only a problem of definite *quantitative* magnitude, but also a problem of quantitative social economic changes and of qualitative technical formulation. The proletarian class struggle and the construction of socialism had to be translated into *specifically*

technical language. The revolution *got down* to the materially technical skeleton of society and thus rose to its highest point of development. Under the guidance of the Party and its Central Committee the working class, firmly carrying out the general line in the struggle against all deviations, is now solving the gigantic problem of the *technical re-equipment of the entire country:* we are living in the period of a great *technical revolution*. This period presents us with new problems, which the working class of the U.S.S.R. will solve with the same vigour, heroism and energy with which it met its enemies in open armed conflict.

1. *Technique in Capitalist Society and the Present Economic Crisis*

"To overtake and surpass the capitalist countries"—this is to overtake and surpass them in the sphere of *technical development*. More than that. We can neither overtake nor surpass those countries unless we beat them precisely at this point—at the material core of our economic life, at its technical foundations. It is essential for us, therefore, above all to *know* what is happening in the sphere of technique in capitalist countries. what are the main lines of technical development; "whither" the technique of capitalism is going, together with all the aspects of the capitalist mode of production and the shocks which it is experiencing. The present condition of capitalist economy is characterised by the profoundest contradictions between the development of the productive forces (and their technical foundation) and the productive relations in the capitalist world, between the technical forces of production and current production, between "technique" and "commerce," between scientific technical possibilities and what is "profitable" from the capitalist point of view. If we take *for the time being* only the technical side of the question, we can formulate the main tendencies of technical development by the following points:

(1) *The economic growth of electrification* (the change from the steam engine to the electric motor; the change from small

stations to gigantic electric power stations due to the progress of the technique of high-tension voltage; the "grid" system);

(2) *the enormous increase in the use of internal combustion engines* (it is necessary above all to note here the Diesel engine and the revolution it produced in farming, transport and aviation; automobiles; motor-cycles; airplanes; tractors; tanks);

(3) *the mechanisation of agriculture* (tractors; reapers; harvesters, and combines);

(4) *new metals and alloys* (super-hardened steel; light metals and alloys);

(5) *the chemicalisation of industry and agriculture* (the synthetic preparation of a series of important products, the permeation of chemistry in metallurgy; the chemistry of coal; artificial fibre; the fertiliser industry; extension of the use of gas, etc.);

(6) *the all-round mechanisation and "automatisation" of production* (specialised lathes; their co-ordination; endless belt; internal works transport, central power and separate motors for each machine);

(7) *the electrification of transport;*

(8) *the extraordinary development of motor transport and automobile construction;*

(9) *airplane construction;*

(10) *the extraordinary rapid development of telephone construction, radio construction, the cinema and television.*

These enormous technical changes, verging on technical revolution, are accompanied by changes in the most diverse technical directions, the power of machines and their aggregates is increasing, all the processes of motion are being accelerated to an extraordinary degree (for instance, revolutions per minute); chemical reactions are being accelerated (catalysis); the coefficients of useful action are being raised.

Needless to say, these profound technical changes presuppose (a) the growing application of science to the processes of production; (b) a change in the qualifications of the workers employed and in the concrete forms of the capitalist exploitation

of the working class; (c) a change in the organisation of production, organisation of labour and management of factories.

The material premises for the growing application of science are the organisation of large factory laboratories, research institutes, scientific and scientific-technical associations; the change in the qualifications of the workers employed is reflected in the increase in the number of such workers as are capable of developing great intensity of labour (control and concentration of attention); moreover, the old skilled crafts are disappearing with the growth of "automatisation;" the changes in the organisation of production of labour and management were brought about by the growth of super-mass production, standardisation, "normalisation" and "typification" of production and so-called "scientific management" (Taylor, Gant, and others). To this must be added "hand to mouth" selling—that is, producing to order and not for stock, and direct selling without the intervention of intermediary selling agencies (the specifically "American" method).

In this way a tremendous change is brought about in the rhythm of production, and consequently in the whole of social life in general; the pulse of life begins to beat much faster and more energetically. The strongest impulses come from the sphere of *technical change,* breaking down all rigid and conservative forms. Old *materials* are being replaced by new (light metals; stainless steel; by-products and substitutes become fundamental products; plastic masses; cellulose in its many varied new applications, etc.); old *machines* are giving way to much more powerful machines, to automatic machines of new design with an enormous productive capacity: printing presses in Cleveland which turn out 400,000 sixteen-page pamphlets an hour; automatic textile looms so constructed that a *single* workman can handle 100 to 110 of them; a machine which produces electric bulbs with which a workman turns out 1,700 an hour, as against 50 to 55 produced by hand labour. During the war airplanes developed a speed of 120 to 150 kilometres an hour—at the present time the record speed is over 580 kilometres an hour; the coupling weight of a locomotive

engine 20 years ago was 70 to 80 tons, today it reaches 300 to 450 tons, while the weight of the train itself has reached the figure of 10,000 tons; 20 years ago metal could be cut at the rate of 15 to 30 metres a minute, today the rate is 120 to 180 metres a minute; the speed of turning metals has increased tenfold, etc., etc.

The old *technological processes* are dying out, and new processes are coming into existence. Such, for instance, are the numerous forms of chemical synthesis: high pressure chemistry, the penetration of physics in producing processes, electric and acetylene welding, the thermic treatment of metals, and hundreds of other processes. The old methods of organising production are disappearing, and their place is being taken by the belt, automatic lathes, the automatisation of all processes, the subdivision of the processes into series of stages, one following the other as on a cinematograph film; the conveyor system and the rational electrification of internal works transport. The old *methods of organising labour* are being discarded with the institution of psycho-technique and of methods scientifically considered and planned and developed in the laboratory for the exploitation of the working class, so that any reduction in the working day or increase in wages is more than covered by the extreme intensification of labour, extraordinary speeding-up and the sharp rise in the rate of exploitation.

The epoch of capitalist rationalisation, which we can understand as a whole only by analysing *every* side of the process, rests, in the last resort, upon the change in the *technical side of production,* upon its material changes.

But this epoch has also developed its own glaring contradictions. These are more clearly expressed in the present crisis —the most acute, most profound and most dangerous crisis for capitalism that has ever occurred since 1825, when capitalist crises in general first appeared on the historical stage. The growth of productive forces clashed with the narrowness of the productive relations of capitalism, and this conflict proved to be so profound because it arose out of the shocks which world economy experienced in the war and post-war periods, on the

basis of its cleavage into a capitalist and a socialist world, *out of crisis in the entire system* as such. The peculiar features of this crisis are reflected in *technique*. Formerly, crises gave an impetus to technique to a certain extent; the most technically-progressive enterprises adopted new improvements, lowered their costs, extricated themselves out of the crisis, competed with other enterprises, made differential profits. The other enterprises had to catch up with them, to reach their level and so on. Now, a different tendency can be observed: a slackening of technical progress. This is due to the far-reaching development of the monopolist character of the structure of contemporary capitalism, to the extraordinary depth of the crisis and the absence of any clear prospect of future improvement. This practice and theory of *technical regression* began to flourish towards the end of the period of so-called "industrial prosperity." The advocacy of a return to small-scale production, to primitive tools; anti-machine propaganda, the attacks against "technique;" the protests against "mass production" (and frequently all this is advanced on the pretext of saving "humanity" from being enslaved by the machine—these are the characteristic features of the ideology of capitalism today. The "popular" press as well as the special magazines and even a leading organ of opinion like the English *Nature* are full of this stuff. The fashionable philosopher of the German bourgeoisie, O. Spengler, has recently published (in the present year) a special book on this subject with the characteristic title: *Man and Technique: An Outline of a Philosophy of Life*, in which, among other things, he portrays the psychology of the bourgeoisie at the present time in the following terms:

Faustian thought is beginning to be saturated with technique. It diffuses familiar lassitude, a sort of pacifism in the struggle with nature. People are turning towards simpler forms of life nearer to nature, they are absorbed in sport instead of technical experiments, they hate large cities, they want to tear themselves away from the yoke of soulless activity, from the slavery of the machine, from the clear, cold atmosphere of technical organisation. It is the most powerful, creative and specially gifted personalities who are turning

from practical and scientific problems towards pure speculation. Occultism and spiritualism, Indian philosophy, metaphysical burrowing of Christian or pagan colour, all of which were treated with contempt in the Darwinist period, have again risen to the surface. It is the mood of Rome in the time of Augustus. People surfeited with life, and fleeing from civilisation to more primitive parts of the earth, are becoming vagrants, are being driven towards suicide. *The born leaders are beginning to fly from the machine.**

The material basis of this *anti-technical* attitude, as can easily be understood, is the crisis of capitalism, which the capitalist ideologists imagine is a crisis of "mechanisation" in general, independent of its historical form. There are, of course, some correct ideas in this criticism of contemporary capitalist mechanisation, ideas that were developed long ago by *Marx:* a one-sided urbanism, converting the worker into a cog in the machine, the narrowing of the spiritual life of the specialised man, and so on. But the *capitalist critics* of capitalism seek a way out not by going *forward* but by going back, along the lines of technical, economic and cultural-ideological *reaction;* they link their protests against technique with protests against *materialist science.* Thus, for instance, Professor Popp, in his work, *Technique as a Problem of Culture,* writes:

> The decline of our culture is rooted in . . . scientific materialism, the ground for which was made favourable by the simultaneous development of technique and industry . . . .*

Naturally, we find the same position taken up in regard to the question of *human* cadres. So-called "technological unemployment" affects many millions of workers and a considerable section of the technical intelligentsia; the chief concern today, therefore, is to reduce the numbers of those entering technical colleges and institutes, to restrict the production of cadres, to create a retrogressive movement in this sphere.

Thus, the contradictions of present-day decaying capitalism are undergoing a tremendous strain; its technical shell is still

* O. Spengler: *Der Mensch und die Technik. Beitrag zu einer Philosophie des Lebens,* Munich, 1931, pp. 81-82.
* I. Popp: *Die Technik als Kulturproblem.* Munich, 1931, p. 9.

moving forward, but it already wears iron fetters; further progress is already outside of the groove of capitalist relations.

2. *Socialist Reconstruction and the Technical Revolution*

It is very interesting to observe how in one and the same epoch a fundamentally different *class* form of society changes the mathematical sign of its development: substitutes *minus* for *plus* and *plus* for *minus*. Under capitalism the whole style of culture, under the pressure of reaction, begins to turn away from technique; in the U.S.S.R., however, it turns towards it In capitalist society anti-mechanisation is becoming the fashionable current ideology; in the U.S.S.R. mechanisation is the slogan of the hour. In capitalist countries they wail about over-production; in the U.S.S.R. mass production (more machines, more factories, more coal, steel, lathes, grain, cattle, cotton, electric power) is the imperative task. In capitalist countries they protest against industrialisation, in our country industrialisation is a slogan which generalises our entire economic policy; in capitalist countries demand falls below supply, in our country supply is less than demand. In capitalist countries production is reduced and machinery is lying idle, in the U.S.S.R. production is extended to the utmost, machinery is employed to the utmost capacity, machinery is overloaded, a furious drive is being made towards further construction. There, they have unemployment; here, we suffer from a shortage of labour; they are striving to reduce cadres; we are exerting every effort to train as large a number as possible. They are putting a curb on the further progress of science and technique; we are striving to develop science and technique as speedily as possible. They are filled with lassitude; the masses of our country are filled with creative energy and constructive ardour.

Modern capitalist economy is *pregnant with a new technical revolution*. But this technical revolution *cannot develop* unless it breaks through its capitalist shell. Capitalism is proving to be a hindrance to the further advance of technique, although this does not in the least mean that technique in general is not developing. The ideologists of capitalism are beginning, as we

have seen, to impute all their troubles to too rapid development of technique in general, abstracting it from its social-historical form: this is one of the symptoms of capitalist decay. But, characteristically enough, Otto Bauer, in his most recent book, *Capitalism and Socialism after the World War,* advances a thesis according to which capitalism adopted new technical improvements too *quickly* and too *spasmodically,* with the result, according to Bauer, that while individual capitalists have profited, "society" as a whole has lost; for unemployment is increasing, aggregate overhead costs are increasing (unemployment pay and so on), and "society" in this way is losing; "social services cost more than the gains which accrue to the *entrepreneurs;* and rationalisation is proving to be false rationalisation *(Fehlrationalisierung)."** Under socialism, says this genius, development would be quieter, slower and more seemly; machines would be introduced only when they did not produce unemployment, and so on.

All this "false wisdom" poured out with regard to "false rationalisation" withers away at the touch of Marxist criticism.

For in actual fact the trouble is not that Bauer applies his wisdom, like capitalism, *on the basis of exploitation.* It would be sufficient to shorten the working day and increase wages in order to cause unemployment and lack of purchasing power to disappear; and planned economy would abolish the crisis. The trouble is that all these things cannot possibly be reconciled with the *capitalist* mode of production. This, and not rapid technical progress as such, is the "root of the evil." Bauer adopts the point of view of the reactionary ideologists of capitalism. Capitalism at present curbs the development of technique, it does not accelerate it. Socialism does not diminish, but on the contrary considerably accelerates the tempo of technical progress; it removes the capitalist chains that restrict technical development, and thereby releases the forces of the technical revolution which have already matured in the womb of capitalist productive relations.

* Otto Bauer: *Kapitalismus und Socialismus nach dem Weltkrieg,* Vienna, 1931.

Such is the most general formula of the technical transition from capitalism to socialism. But, of course, it is quite inadequate, particularly when we deal concretely with the U.S.S.R. For it is necessary to take into consideration both the natural *place d'armes* of the entire development and the whole web of historically developed relations: (a) the national "wealth" of the country, (b) its technical level in general, (c) the present phase of its technical-economic development, (d) its relation to its capitalist neighbours, and so on.

Our revolution has entered the *period of reconstruction* (the period when the foundations of the socialist order are being laid); we have entered the phase of the technical revolution. This is a fact impossible to deny. Therefore, as Comrade Stalin has truly said: "Technique in the period of construction decides everything."

From the technical point of view, we are rushing through several periods at a very fast rate: (1) the period of the old technical basis characteristic of the bourgeois-landlord economy of tsarist Russia (our historical heritage); (2) the period of *capitalist* technique (typified by imported equipment); (3) the period in which socialism begins to develop on *its own* technical foundation, (that is, when it begins to work out a *new type* of socialist technique in the strict sense of the word). Needless to say, it is necessary here to emphasise as strongly as possible that these periodical divisions are merely conventional from several different points of view: first of all, it must be noted that all technique (the machine, technical method, etc.) when introduced into the system of socialist productive relations, by that very fact becomes socialist technique; further, all technique, even "pure technique," changes its character, for machines, entire factory complexes and technical-productive complexes generally function in a different way, combine *in an entirely new manner,* and consequently, represent as a whole a complicated technical unit of a *different* order; in reality, one phase of development merges with another; *different* technical elements—the old heritage, imported equipment (or equipment copied from imported models), and the embryo of a perfectly

new type "live side by side." However, the above-mentioned division has its significance. The technique of feudal society is characterised by the water-mill; the technique of capitalism by the steam engine; the technique of socialism by electric power, developed to the "final point" of the electrification of the entire national economy. The technical revolution of socialism (or, more concretely, the technical reconstruction of the U.S.S.R.) must develop and give free scope to all the forces that are shackled by capitalism, and must reshape them in its own way. The fundamental lines of this technical reconstruction, supported by the enormous natural wealth of the U.S.S.R., are as follows:

1. *The industrialisation of the country:* a gigantic increase in the *quantity* of the means of production: the construction of mighty power stations, metallurgical works, engineering works, chemical combines, the opening up and operation of new mines, the transformation of the whole of agriculture into a branch of industry, the building of new types of towns and dwellings, roads and bridges, etc., etc.

2. *The electrification of national economy,* complete and developed. The construction of central electric power stations and central hydro-electric stations of a super-powerful type, and their organisation in districts. A ring of high-power transmission stations. Electric main lines. The electrification of transport.

3. *The development of all forms of transport:* electric railways, automobile, water and air transport, etc.; the creation of a dense network of lines of communication. The "automobilisation" of the country.

4. *The development of mass production and the application of the internal combustion engine,* particularly portable engines for tractors, automobiles, motor-cycles, airplanes and so on.

5. *The all-round mechanisation of industry, transport and agriculture.* The mass application of tractors. Combines. New types of machines with a higher power than those employed under capitalism. Electric ploughs. The development and application of agro-physics. The technical linking-up of the agri-

cultural industry with the working-up of agricultural produce on a combine basis.

6. *The utilisation of new materials, raw materials, fuel.* High-grade steel. Light metals (aluminum, magnesium and others). Plastic materials. New building materials. The development of the shale industry, etc.

7. *The chemicalisation of industry and agriculture.* The decisive expansion of the chemical industry. Synthetic chemistry. Wide use of the principle of the combine. Metallurgy. Coal. "Gasification." The chemistry of timber. Artificial fibre. The fertiliser industry. Apatite and naphthalene.

8. The reorganisation of industry *on the basis of widely applied "automatisation"* of productive processes.

9. The development of communication services. The creation of a first class network of postal-telegraphic and telephone services, of a network of radio stations. The development of television. The conversion of the entire U.S.S.R. into a single cultural whole on a technical basis of a developed service of communications.

10. *The development of the cinema*—colour, stereoscopic, and sound film.

11. *The widest development and application of science.* The construction and first-class technical equipment of institutes, laboratories, technical colleges and universities.

Such approximately are the contours of the technical reconstruction of the country. It must be said, however, that the solutions of various new scientific-research problems may lead to the practical presentation of a series of new *technical* problems (the problem of helio-technique, the wireless transmission of power, thin stratum insulation, the adoption of large and powerful accumulators, the utilisation of the difference in temperatures of air and water in the North, etc.). On the other hand, *geological investigation* and the study of the natural resources of the U.S.S.R., which so far have been investigated only to an insignificant degree, may raise the question of new industries, of new technological processes, of a new localisation of industrial units and even of industrial centres. It is per-

fectly obvious that the more intensely *scientific research* is carried on, spurred on by the enormous requirements of construction, by new *quantities* (the magnitude of new constructions, the magnitude of state farms and districts which have been completely collectivised, mass production); and by new *qualities* (new types of factories, the combine principles, planning, the division of the country into geographical-economic regions, the electrification of the processes of production, new types of machines and apparatus), the more powerful will be the *development of technique,* the more victoriously will the economy of socialist society move forward.

3. *Technical Reconstruction, the Problem of Cadres, Problems of Technical Propaganda and the Technical Promfinplan* *

The most important force of production is the working class itself, wrote Marx. If this point is raised in relation to the peculiar features of our social system, it will not be difficult to see that the above-quoted postulate has exceptionally decisive significance for us. For, in the final analysis, all the successes of socialist construction flow from the development of the *creative energy of the mass.* It is precisely because the working class feels itself to be the governing class, the supreme class, the organiser, the subject of history and not its material, that from year to year it creates and puts to use new and additional life-creating energy. Therefore we must not only discuss "inanimate technique" (that is, machines, apparatus and means of production in general), and not only technical methods (formulas for technological processes), but also living human beings as the most important factor in production; we must discuss their *technical qualifications*—that is, their knowledge and technical skill, whether they conform technically to the new technical problems, and — in very close connection with this—whether they conform to the new means of production on which and with the help of which they must work. After

* Industrial and Financial Plan.—*Ed.*

the rout of the French Army in 1871, it was said that "the victory was won by the German schoolmaster"—that is, that the elementary literary and relative intelligence of the masess had enabled the forces of Bismarck to triumph over the forces of Napoleon III. Undoubtedly, it was due to the high technical qualifications of the German industrial workers and the very high quality of German technique and German engineers (who moreover were especially strong in numbers), that Germany was able in the World War to offer such extraordinary resistance to her enemies, who far exceeded her resources in men and finance.

Let us examine our immediate future from this point of view. We must draw *many millions* of new people into the process of industrial production. Hence, this is a question that affects many millions of people, taken from conditions of village life (and these form the most significant part of the whole), people lacking industrial tradition, knowing nothing of towns, factories or machines. At a rough calculation, these people, towards the end of 1937, will number more than 18 millions. This new mass, however, will be confronted with the *most perfect* instruments of labour, the most complicated lathes, precise apparatus, the "belt," etc. And the problem concerns not only the towns but also the country. The village is ceasing to be a village, for it is rapidly becoming industrialised, in the sense that industry is penetrating into the village and also in the sense that agriculture is being more and more organised on industrial lines. An enormous quantity of complex machinery and tractors is streaming into the countryside; an enormous amount of mineral fertilisers will be steadily supplied to the country; the ability to handle select seeds will be more and more required; stockbreeding is being subjected to the power of electricity. In brief, here too the same problems of skilled labour, of the technically educated *masses,* of educated, skilled *workmen, technicians and engineers,* testing stations, laboratories, and institutes for scientific research arise. If we weigh up these really gigantic needs which socialist construction gives rise to, if we take into consideration the rapid *tempo* of this

entire development, if finally we examine the quality of the new millions who are entering what to them is an unknown world of machines, the immensity of the problems of the training of human forces for socialist construction will be clear.

There is still a huge gap which may become a menace unless we exert all our strength to bridge it. A number of our large new enterprises have already given warning signals of this danger: the Stalingrad tractor works, the Nizhni-Novgorod automobile factory, the "Gigant" tractor shed, match factories and so on. The high percentage of damage to machinery, the high percentage of spoilt work, the poor quality of goods turned out, the relatively small output, the high cost of construction, etc., all reflect the lack of conformity to which we referred above.

This applies both to the technical "low grades" (lack of skill, the rawness and ignorance of the workers) to the technical "high grades" (lack of skill and the weakness of technical supervision), and also to the higher administrative branches, which (and it is important to understand this) were also confronted with a new type of problem, in which economics directly mingles and merges with technique. That is why our enemies looked forward hopefully to seeing "the Russian bear" break up the delicate machinery and apparatus it has imported from abroad. This sweet hope, of course, will not be realised; we are learning technique; we shall master it in precisely the same way that we mastered the art of war, the art of government, the art of organising masses and in the same way that we learned to raise our national economy. But, of course, it is greatly in our interest (1) to shorten the period of learning, (2) to reduce the cost of learning, (3) to produce real, first-class technically qualified people.

Hence, the problem of the *cultural revolution* turns out to be a problem of technical culture. Of course, a certain level of general culture is an essential condition precedent to technical culture. It is essential therefore to liquidate elementary general illiteracy. The "schoolmaster" must, with the help of wide public opinion, do his work for us too. It is enough to say that there is a direct, empirically demonstrable interdependence

between high literacy and productivity of labour. The Donetz Basin, where, in spite of mechanisation, the question of fulfilling the Promfinplan is still an acute one, is characterised by a comparatively high proportion of illiterates (15 per cent) and semi-literates; the raw and unskilled floating mass of workers, lacking in proletarian training, almost illiterate and completely ignorant of technique—this is the chief obstacle in the way of the rapid progress of the Donetz Basin coal field. The liquidation of technical ignorance must proceed simultaneously with the liquidation of elementary illiteracy. We have got to understand that the whole of our culture must be much less "literary" and "humanitarian" in the old sense of the term, and in a certain sense must become much more "technical." The feudal regime in the sphere of education (and this is a very important side of cultural life) was characterised in our country by the classical *gymnasia,* and the teacher of ancient dead languages was the central figure in this sphere. Development towards capitalism produced the *realschule* and the technical school. Now, the polytechnic is the *foundation of our entire system of education,* and the whole system of culture is changing accordingly: it is becoming *much more technical.* But this does not mean that our "technicalisation" must be shaped on the narrow, ugly model of American technicalisation, which cripples body and soul. Planned economy demands an understanding of the principal interrelations of the social whole, breadth of interests and profound philosophy as well as specialisation in a concrete sphere. Technique today stands in the very centre of our thoughts. But it is regarded as a *means* for definite purposes: to meet the *growing needs of the masses.* To develop the masses, to raise their material and cultural level—this is the chief and all determining object, in contradistinction to the principle of profit and in contradistinction to bare technicalisation, which transforms technique into a fetish standing over mankind.

In order to liquidate technical ignorance, we must utilise all the levers at our command in this sphere: the school system, the whole system of school extension education, the organisa-

tion of "correspondence" courses, specialist technical institutions, technical colleges, scientific research institutes, special *organisations for technical propaganda,* technical societies, etc., etc. All these must be mobilised for the purpose of liquidating technical ignorance and for the raising of technical qualifications, on a horizontal plane (according to specialised subjects and specialised branches of industry) as well as on a vertical plane (training workers to become foremen, training the middle grade technicians to become engineers, etc.). The problem for the "lower grades" is the introduction of a technical minimum;* for the "higher grades" it is to train a corps of highly qualified (politically sound) administrators and engineers. These problems must be solved with all energy, speed and determination.

If we were to formulate the main lines of the work of technical propaganda (and technical education), the formula would be as follows: the struggle for liquidating technical gaps, the struggle for the fulfilment of the current Promfinplan in every producing unit; the struggle for the fulfilment of prospective plans. The cornerstone should be *the struggle for the fulfilment of the Five-Year Plan* and the preparation for the second Five-Year Plan.

But here it is necessary to note the following. Until now our plans have been formulated with emphasis on the *economic* side without sufficient preparation on the technical side, without the use of technical indices. But the present phase of our development imperatively calls for the careful study of all the fundamental and decisive technical indices in their entirety (both quantitative and qualitative). They must, of course, be considered in close connection with the economic indices, but technique must win its proper place in the whole plan and in every link of that plan, from the factory right up to the control figures of the whole national economy.* The choice of types of machines, technological processes, the proper coefficients of useful activity, the technical side of reconstruction, the working out of the general technical line, emphasis to be laid on par-

* A standard minimum of technical education which all workers without exception should receive.—*Ed.*

ticularly "urgent" technical tasks; the planning of technical reconstruction by branches of industry right down to each factory—all this is now a mature problem, which must be solved at all costs. Not only must we have a system of economic accounting, but also a system of technical accounting, based on systematic control with the help of precise *measuring instruments*. This is the very thing that will enable us to mobilise mass attention and to organise mass supervision over the fulfilment of the technical indices. This is the very thing that will enable us to give the whole of technical propaganda a practically operative character, and unite theory with practice; the idea of fighting for the fulfilment of the technical plan and the provision of technical indices must be the central idea around which the work on technical propaganda must revolve.

Thus, the Promfinplan must become a Techpromfinplan, *i. e.*, the technical side of the plan must be given greater emphasis. For the factory this means that, on the basis of the concrete plans of output and of the scale and schedules of capital construction, etc., outlined by the Party, the government, the Supreme Council of National Economy and the combines, a plan for the corresponding technical measures must be drawn up. This plan should consist of approximately the following main parts: (1) technical indices—quantitative and qualitative—for every machine, every group of machines, for every shop and every factory; (2) technical measures to co-ordinate the work in each shop and between the respective shops; (3) the measures required to provide the necessary technical qualification for workers, technicians, engineers and managers, (this applies to both the old ones and newcomers); (4) a plan of rationalisation measures; (5) the application of achievements of scientific research in the given branch of industry; (6) the application of the suggestions of workers and inventors. Such problems, like the struggle against spoilt work, the utilisation of by-products, and so on, can be really solved only with the help of a technical plan. The logical conclusion of such a plan (and subsequent

*The economic plan worked out in detail in figures.—*Ed.*

premises for drawing up similar plans in the future) is the application of a number of absolutely essential measures: the technical "passportisation" of machines (every machine must have a technical passport indicating its maximum capacity and the technical conditions under which this can be achieved), standardisation of castings, the publication of manuals explaining new machines and new technological processes, etc. Such a technical plan, drawn up in a sufficiently popular manner to enable the masses of the workers, not only in the factory concerned, but in all factories, to understand, would serve as a basis for the most intensive exchange of technical experience. Of course, the main elements of such a technical plan clearly exist in every enterprise; but much more must be done to work out technical problems, to link up all the problems that confront the whole factory and to develop this idea further until it embraces the *working out of concrete plans of technical reconstruction,* preceded by preliminary *technical discussions* of these plans.

On this basis, corresponding technical propaganda must be carried on as part of the *process of the production of cadres:* the liquidation of the technical ignorance of broad strata of new workers and training them in the spirit of socialist attitude towards the means of production; raising of the productve qualifications of the skilled worker, with emphasis on the latest achievements of technique in the given spheres; the raising of the technical qualifications of the middle-grade technical personnel; and finally, the raising of the qualifications of the general body of administrators, managers and engineers, informing them of the achievements of technique abroad—all this work must be developed in the struggle for the working out and fulfilment of Techpromfinplan, current and prospective. Here, too, we must with all our energy adopt the method of "shock" work, socialist competition conferences, roll calls, technical "battles" and mutual challenges—a method brilliantly justified by the experience of the grand work of socialist construction.

4. *The Present Technical Basis of Technical Propaganda and the Means for This Propaganda*

For the training of cadres, as well as for the whole of our work of construction, we have been given an extremely short period of time. The question of rapid tempo is thus the decisive question. But this acceleration of tempo—provided the work is planned and carried on on a mass scale embracing millions of workers and collective farmers—can be achieved only if we avail ourselves of the *latest achievement of technique* in the *sphere of technical propaganda itself.*

"We are indolent and incurious," Pushkin once wrote of the Russian people. Much water has flowed under the bridge since then: the representatives of the nobility have gone to eternity, the "people" have remoulded their own "nature", the proletariat is revealing everything in the world—but not indolence. But we still retain the habits of the provincial, though they do not come to the surface as much as formerly. We are extremely *backward* in regard to the technical basis of technical propaganda. We have as yet almost nothing in the way of industrial technical cinema films. We have literally nothing in the way of socially thought-out technical educational accessories. Our radio service is not yet adopted to the task of technical propaganda. The sound film has only just appeared here, although "silent" films are only a memory in the important centres of the West. The colour film is still unknown here, so is the stereoscopic film. Television is not widely practiced.

And yet in capitalist countries, these problems have not only been solved in the laboratory, they have entered into daily life. They have been "tested" by experience. All these contrivances increase in number with lightning rapidity, but we still continue to be provincials.

We must put an end to this once for all: we must more boldly utilise the latest technical forms of transmission of sound and vision. In vew of the shortage of qualified forces, it is absurd that a first-rate scientist or technician should go from town to town giving lectures; he could speak to *tens of millions*

of people at once by radio. It is a waste of time for our highly skilled forces, hurryng and panting, interrupting their scientific work, in the intervals between meetings, day in and day out, to deliver oral lectures. It would be far better if they wrote first-class standardised text books for correspondence courses (according to categories of students), which could be published and issued in hundreds of thousands and millions of copies instead of the rubbish that is sometimes published. The method of holding private conferences and meetings in a particular geographical spot may now be considered out of date, for many such conferences could be conducted by radio. The overwhelming importance of this means of communication for *technical propaganda,* the exchange of experience, and the struggle for the Techpromfinplan, will be readily understood. We must have a first class technical radio service, colour and sound stereoscopic cinema films on industrial-technical subjects; we must have a television service. We must create, in every corner of the U.S.S.R., in every important enterprise, in all the large state farms, collective farms, tractor stations, etc., the necessary bases to serve the surrounding districts.

We must begin to build *technical museums* of the type of the South Kensington Museum in London or the Munich "German Museum." This latter institution is first-class "basic capital" for technical propaganda. Here are collected all the important means of production; the important technical methods in the various branches of production are demonstrated in their historical aspect, and also *in motion.* It is thus possible to see the real processes of production; one can control them oneself—the more so that the most important processes and means of production are shown in their natural size and not in models or diagrams. The great work of socialist construction demands that we too set up such a monument. This monument would not be a dead weight: it would be a living instrument for powerful technical propaganda, a place where the vast masses of the proletariat of the towns and proletarian visitors to the capital could see at first hand all the "marvels of technique," all the technical innovations in the U.S.S.R. and foreign countries,

where the connection between different branches of planned economy and the connection between technique, science, economics, and the class struggle of the proletariat engaged in building up socialism could be clearly demonstrated.

We must begin to devise carefully planned technical educational accessories for technical propaganda and technical training. Although it is true that all this propaganda and this training must grow out of factory and out of industrial practice generally, it does not follow that these technical educational accessories should consist exclusively of parts of machines or apparatus or other factory equipment. Special technical educational accessories of the most varied types must be provided. It would be advisable to take advantage of the rich experience of the specialist institution they have in Germany (the Educational Accessories Organisation of the German Technical School Committee) which, with the help of prominent pedagogue-engineers, has created a well planned system of technical educational accessories for various categories, various ages and various specialties.

We must press forward with all our energy the publication of *technical literature,* from militant technical leaflets to bulky technical encyclopedias. We must create first-class lively technical journals, which will keep pace with European and American journals, unite the best scientific technical forces and maintain both our theory and practice at the proper level. We must flood the country with a mass of technical literature of the most varied kind: hand-books, text-books, symposiums, pocket encyclopedias, posters, diagrams, and so forth. But here we must strongly emphasise the *problem of quality:* tables of logarithms with printers' errors are as bad as false weights. We must publish, as far as possible, only first-rate material.

We must also establish a whole system of technical libraries, exhibitions, archives for drawings and diagrams, etc., etc. But in all this we must remember: *planned* work; *mass* work; work with the most perfect technical resources. We must accustom ourselves to new speeds, new methods, and new technique *in the field of technical propaganda itself.*

5. *Technical Public Opinion*

Technical propaganda will bear fruit only if it rouses, mobilises and throws into the struggle large cadres of people, who in their turn will influence wider sections of the workers. That is why the creation of a body of active technical propagandists, the rousing of workers' technical public opinion and of scientific-technical public opinion among engineers, technicians and scientists is so very important. We must devise organisational forms that will serve as a safeguard against bureaucratic rigidity; they must be forms which will not permit *these* organisations (circles, societies, associations and so on) to be converted into "branches," "sectors," or "departments" of any apparatus whatever. These social organisations must be created from below; people should group themselves according to work which they know, which they love, according to the problems which they are studying. This must be technical public opinion, *i. e.,* it must express the *technical* equivalent of the policy of the Party and of the Soviet government. Discussions must be organised—let them be heated and passionate! —on *technical* questions ranging from problems concerning the factory or shop to general problems of the technical reconstruction of the entire country. Under the leadership of the Party, which is and will be the principal and the most powerful lever of every mass revolutionary action in our country, we must boldly and determinedly set out to create voluntary circles, groups and brigades consisting of the comrades who are really interested in this work and love it. Of course the majority of such circles will be directly connected with the problems of the particular factory in which their members are employed. But they can unite to study special problems which interest them in common, special spheres of problems and general problems; inventors, rationalisers, members of brigades for mastering technique, physicists, those interested in the problems of the Kuznetz Basin, technical correspondents and others can unite in groups, circles, associations according to their particular interests. It would be more advisable for them to group

themselves round *technical newspapers* (technical wall-newspapers, district technical journals, central technical papers) and *technical journals,* forming associations and societies according to their specialised interest and at the same time maintaining contact with each other. *Scientific-technical societies* must really be *scientific-technical societies,* and not courses of light propaganda. Their main object should be to find solutions for a whole series of scientific-technical problems, to bring up questions of a scientific-technical character, exchange engineering experience, provide systematic information about foreign achievements, and so on. The view that such organisations have become obsolete is totally wrong; on the contrary, a great future is before them if they can become living cells of scientific-technical thought. These societies must be, in the first place, thinking laboratories, *producing* new technical and scientific ideas and developing means for their direct *practical application.* These societies must be a sort of school to raise the qualifications of our engineers, technicians and scientific workers. Of course they must maintain the closest possible contact with the workers' technical "active" and they must provide lecturers, instructors, writers of books and pamphlets and so forth. But this must not divert them from their special and central task: while raising their own qualifications, to bring up new technical and scientific problems, discuss them, find solutions for them and help to get them applied. These societies must bring together—on a comparatively high level—professors and pedagogues (scientific research workers) and factory engineers, and in this way help to bring together theory and practice. An important part in the work of organising, and in the activity of, this type of society must fall to the *scientific-technical journals,* which must be raised to a correspondingly high level. And one of their immediate objects should be to establish contacts between the *workers' technical "active"* and *engineering scientific public opinion.* The fulfilment of all these tasks will mean that a tremendous living force will be put into action and this activity of enormous human forces will then play an exceptionally big role in raising our technical culture. The

development of technical public opinion will be a most important lever in the enormous work of technical propaganda.

6. *The Organisation of Industrial-Technical Propaganda*

The fact that the means for technical propaganda at present available are weak and inadequate does not imply that this work cannot be developed in the near future, or that we must "wait" until we have everything we require. For a certain period we shall still lack technical cinema films; we still have to produce these. There will still be a shortage of technical books and pamphlets; there will still be a shortage of technical education accessories. We must overcome these "tight places." But we must start on the work at once and systematically and unswervingly develop it.

The bases of technical propaganda must be the scientific research institutes, the higher technical colleges and the "leading" factories in the given branches of industry. The *combination* of these three forces, in which the best of our technical natural science and technical-pedagogical cadres are concentrated, will ensure that all the essential factors will be taken into account with sufficient thoroughness in our technical propaganda: both the immediate requirements of production and that which is regarded as decisive from the technical-pedagogical point of view. The combination of these forces, together with the representatives of the Trade Unions and the general leadership of the Party, is the main base of technical propaganda, which will also guarantee the competent working out of the necessary methodics. Foreign practice—and particularly American practice—shows how big a part research institutes and the higher technical colleges play in technical propaganda. The *combine* (higher technical college, the research institute and model enterprise) must serve as the base for the creation of *technical literature* according to branches of industry; for the creation of a *technical cinema,* which will serve the needs of specialised branches of industry; for the organisation of technical propaganda by *radio.* Concretely, this means, for example, that the work creating a scientific-technical literature must be decentral-

ised. Instead of a single centre, which "made" (or, more truly, imagined that it made) all books and pamphlets and issued them, it is necessary to create editorial bases in connection with the specialised combines. These editorial bases, consisting of representatives of scientific research institutes, higher technical colleges and leading enterprises in the given branch of industry, must draw up plans for publishing technical literature, must select the necessary authors, edit a whole series of publications (in the first place, specialist journals), and must answer directly for their content and their quality. They must have *direct* dealings with the printing offices and must *themselves* see to the timely publication of their productions, etc. The Scientific-Technical Publishing Department of the Supreme Council of National Economy should merely be responsible for general planning and regulating functions (drawing up general plans for all sections, endorsing the plans of the lower groups, etc.), *plus* the direct management of fundamental literature and some special forms of literature.

This combination of forces should serve as the base for the organisation of other important levers of technical propaganda (the cinema, radio, educational accessories, etc.). Of course, the special features of these forms of technical propaganda must be taken into consideration.

We have already referred to the tremendous significance of *technical* public opinion. Now I want to discuss the *direct* apparatus for organising *technical propaganda.* As a result of the decision of the Central Committee of the Party, a special apparatus for the organisation of technical propaganda has been set up at the Supreme Council of National Economy, in connection with the combines and in the factories. Below, in the factories, this apparatus is in charge of the assistant director for production conferences and technical propaganda, who is directly responsible to the group or sector for industrial-technical propaganda of the *combine or trust.* This sector or group is, in its turn, responsible to a sector of the Supreme Council of National Economy of the U.S.S.R. This apparatus, however, is an apparatus of a special type. It must have planning and

operative functions, but it must, above all, be able to combine this work with the work of giving general assistance to technical public opinion. The creation of an apparatus for the organisation of technical propaganda does not at all signify that it must do everybody's work for him. A proper distribution of functions must be made. The apparatus of industry supervises, plans and organises the work, but it must not usurp the functions of technical public opinion or of the organisations conducting technical propaganda. Contacts between the Supreme Council of National Economy, technical public opinion and other departments must be maintained by a Council of Industrial-Technical Propaganda of the Supreme Council of National Economy sector. On this council all the most important organisations interested should be represented (the proposal of the Commissar of Education, Comrade A. Bubnov).

What are the main levers of this sector? By the decision of the Central Committee of the Party, the State Scientific-Technical Publishers have been handed over to the Supreme Council of National Economy. A special organisation must be created for the production of *technical cinema films,* and another organisation for the production of educational accessories. The Technical Propaganda Sector of the Supreme Council of National Economy is also studying the best ways of employing *radio* in the interests of technical propaganda. Besides this, the Supreme Council of National Economy is organising an *information-bibliographical bureau,* which will have to develop its own cells in the lower organisations. A bureau for the organisation of *technical consultation* will also be organised, the chief task of which must be to organise technical consultation cells in the factories. It will be essential to create a series of auxiliary organisations like groups of technical propaganda among children, various kinds of methodological councils and so on. Finally, there are two other important levers that must be employed: (1) a special technical newspaper, which will be the decisive force in the work of creating a *technical workers' "active,"* in the work of organising a broad network of technical correspondents, etc., and which may become a centre for

organising technical competition among the masses; and (2) a leading *scientific-technical journal.*

In the outlying republics and regions, the Councils of National Economy must create corresponding sectors for industrial-technical propaganda. Their principal levers will be the editorial bases, cinema halls in the higher technical colleges or institutes, etc.

In the lower links, the *assistant director for production* conferences and industrial-technical propaganda now has new tasks imposed upon him. It is precisely in this *link* that it is important to obtain, in the first place, an efficient combination between operative work and the creation and organisation of technical public opinion. To facilitate in every possible way the growth of technical public opinion, to safeguard it from bureaucratisation, and render it systematic aid—this is the primary duty of the lower link of the industrial-technical propaganda apparatus.

Not less important is the task of building up an active body of technical propagandists—the technical "active." In every factory, among the shock-brigade workers in the first instance, among the rationalisers and inventors, among the members of the Young Communist League, among the more advanced of the young workers and among the old engineers and technicians, there are cadres which will take up the work of organising and carrying out technical propaganda. The creation of this "active" is the major premise of the entire work in the factory. It is necessary at the start, however, to utter a note of warning against the danger of the whole thing's being reduced to "propaganda to urge the necessity of technical propaganda" and only that. We must proceed as quickly as possible to the work itself, *i. e.,* to determine what is required in the first place in the *particular* factory, who will do the propaganda work, *how* and in what form this propaganda will be carried on, and to begin to give this work material expression.

The direction and content of this work depends, in the first place, on the character of the factory and on the concrete position of affairs in the factory. The most important points

to bear in mind are: the working-out and clarification, with the help of specialists, of the main points and the main indices of the technical plan of the factory; the elucidation of the weak points in the factory and their causes ("gaps," in fulfilling the plan, spoilt work, poor quality and so on); the adjustment of technical propaganda to secure the liquidation of these weak points (analysis of the quality of the output, materials, technological processes; demonstrations of methods of "cure"; exhibition of the best technical work of the particular type and so on); propaganda for the purpose of acquainting the workers with the means of production, propaganda of all kinds of technical improvements, information on new devices, etc. Simultaneously, the technical "active" of the factory, with the assistant director for technical propaganda at its head, must learn how to elicit the technical needs and interests of individual workers and groups of workers. On this basis it is essential to give efficient help to the organisation of every kind of circle, and to other organisations which have to do with these needs. Such steps, as for instance, serving the needs of new workers, acquainting them with the methods of production, with the various machines and groups of machines on which they will have to work, the creation of every sort of circle for the raising of qualifications in connection with the weak technical sides of production, etc., etc.—all this must be the result of a thorough knowledge of every side of a particular branch of industry and its technical problems. All this cannot be outlined in detail beforehand and for that reason the greatest mobility is required.

The work of technical propaganda, revolving round the Techpromfinplan, must become part of the production conferences which the technical "active" will raise to a much higher and technically much more efficient level.

It is essential also to take into account all the material points which serve technical propaganda in the factory. One of these points must be the shop and *factory laboratory*. Unfortunately, in the majority of cases these laboratories are still in a very bad and primitive state. This is one of the gravest problems

in our factory life. That is why these laboratories must be improved to the utmost extent and gradually converted into bases of *technical propaganda* in the factory, linked up closely with scientific research institutes and higher technical colleges. Perfectly new tasks now confront the factory technical *libraries*. Use must also be made of the clubs for technical propaganda; specialist educational workshops, exhibitions, cinema halls, technical radio stations, etc., should be organised. In this way, the slogan of the Party, formulated by Comrade Stalin—to master technique—will obtain a base for its realisation.

Conclusion

We are living in an exceptional period. The capitalist world, although still powerful, is doomed and is in the throes of crisis. Its philosophy has been formulated rather strikingly by Spengler, who very cynically rates the virtues of "the beast of prey" higher than anything in the world, and who sees in war, violence and deception the most "human" qualities. This Spengler, in the conclusion to his last book, writes the following epitaph of capitalism:

We were born in this period, and we must courageously pursue our way to the end—the way which has been ordained for us. To stand by our lost positions without hope, without future salvation—this is our duty. To endure, like the Roman sentry whose bones were found before the gates of Pompeii, who died because they forgot to relieve him at his post when Vesuvius began to erupt. Therein lies greatness. This shows dignity of race. This honourable end is the only thing that mankind cannot be dispossessed of.

This philosopher of bourgeois bestiality is not mistaken. Revolutionary Vesuvius has put an end to capitalist rapine. And while the old world cringes in the knowledge of the hopelessness of its position, the working class in the U.S.S.R., with great heroism, at the call of its Party, under the leadership of its compact, Leninist, Central Committee, will go forward, after its victories in the class war against the remnants of capitalism, to the new great *victory of the socialist technical revolution.*