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WORK AND STUDY (III)

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Nato, 13 May 1959, by C.S.R. Manders)

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Introduction

At the beginning of the 1959/60 school year in the USSR the facts of Soviet schooling are best epitomised in the words of Dr. Derthick, the US Commissioner for Education, who is reported¹ to have said that:

"he and his staff had been startled by the original terms of the education reform.

"But after conferences with Soviet officials he found that the changes are not going to alter the basic program substantially.²

"He emphatically denied that there was any reason to expect the watering down of the academic content of the Russian elementary and secondary school as a result of the reform... The reform will increase the number of students who will combine study and work during the last three years of the ten-year school. An indication that this is not going to detract from academic goals is the announced intention to add an eleventh year to the secondary school."

Thus Mr. Derthick's conclusion coincides to a remarkable degree with that of Background Information, 5 January, 1959 ("Crystallization of the Educational Reform") which also expressed the opinion that "the time to be spent on vocational training in the 11-year schools will be compensated for by the extra year."

Mr. Derthick and his ten-man team, after their visit to more than 100 educational institutions in the USSR, cannot be said to subscribe to the recent picturesque but inaccurate

¹New York Times, Amsterdam edition, 7 September 1959.

²This statement is confirmed by Max Frankel's article from Moscow, (New York Times, 2 September 1959) which adequately describes the reform as a "moderate switch of emphasis."

dictum of Mr. Nicholas DeWitt, who wrote that:

"...whenever the labor supply gets tight , general schooling gets the ax. In the four decades of Soviet history this is the third time that general education for the masses has met this fate..."³

From the excerpts above it is crystal-clear that the US Office of Education sees no likelihood of "general schooling getting the ax." It is implicit in the Office's report that general schooling will be improved in so far as eight years of first-stage education for all children are better than seven years, even where there is "a decidedly stronger industrial-arts-vocational orientation."⁴ It is obvious, though not explicitly stated in the report, that the brain of a 15 year old child is better adapted, because more mature, to grasping the more advanced subjects in the curriculum than that of a 14 year old. Precisely the same can be said of the second stage (in which the 11 year school replaces the present 10 year one).

If Mr. DeWitt is mistaken in his conclusion as to the axing of general schooling, what of his premise that the labor supply is getting tight? At a time when labor was in short supply, it is surely arguable that no nation would choose gradually to raise the universal school-leaving age from 14 to 15 and the secondary school-leaving age from 17 to 18. Yet this is what the USSR is now doing. Incidentally Mr. DeWitt rightly argues that "Soviet education is subordinated to economic planning." Since the economic plans evidently call for better educated workers to reach the factories for fulltime duty a year later than they would have done with the former system, one may be forgiven for wondering whether the labor squeeze is considered to be very serious. At all events, some figures given by A. Bordadyn, deputy Chief of the Labor Reserves Administration, and S. Sokolov in the July issue of Kommunist (No. 11) do not suggest much anxiety on the point in Moscow.

This article states that between 1950 and 1958 the annual increase in the number of workers and employees averaged 1.96 million. In 1958, by comparison with 1940, the number of workers in industry, building, the sovkhozy, MTS and RTS had increased by 100.1%, and in other branches by 52.3%.

The article continues to show some interesting new figures on the place of origin of the annual compulsory labor drafts for industry and building (orgnabor):

Year	% of workers from rural areas	% of workers from towns
1952	60%	40%
1956	33%	67%
1957	36%	64%
1958	34%	66%

³Problems of Communism, May-June 1959.

⁴See Appendix B to the US Office of Education's report, by William K. Medlin.

Thus the deliberate depopulation of the countryside is slowing down rapidly, or as Kommunist puts it:

"In recent years orgnabor of workers for industry and building has been carried out mainly from the urban population. This has been possible thanks to the considerable growth of mechanization and automation, the increase in the cultural standard of the working class, and also as a result of the growth of the urban population and the increase in the labor resources of the towns."

Demonstrating how orgnabor is gradually losing its original raison d'etre, the article cites the example of Saratov Sovnarkhoz (on the northwest border of Kazakhstan, in the RSFSR) which for the past 2 or 3 years has been able to satisfy its labor requirements internally, without importing labor from the over-populated areas in the west of the USSR. It is certainly this type of process which led A.N. Shelepin, the former 1st secretary of the Kom-somol, to make his short-lived proposal 3 years ago that orgnabor should be abolished altogether. It is the same situation, no doubt, which led Khrushchev to propose to the 21st Party Congress that the time had come to abolish special financial incentives for those willing or compelled to take jobs in Siberia and similarly unattractive areas.

These facts naturally do not mean that the distribution of labor in the USSR is yet good enough, any more than it is in any other country in the world. As Kommunist puts it:

"In the old industrial centers considerable labor resources have accumulated, while the new centers experience difficulty in recruiting workers for building sites and for new plants. Thus there are large labor resources in Leningrad, Odessa, Moscow, and some other big towns,⁵ while the areas in the East, Siberia and the North are experiencing an acute shortage of labor."

There seems to be no reason to doubt the accuracy of this statement, since it is confirmed by the recent steps taken to tighten up the passport regulations in the large towns. In the preceding paragraph, Kommunist reminds its readers that the "many enterprises which are now switching over to a seven-hour day, usually avoid recruiting additional workers."⁶ It may be added that in view of the permanent state of production mania which afflicts all communist regimes, these enterprises would not now be going over to a 7 hour day unless they already had workers enough for the present state of demand. The alternative,

⁵Riga is another example quoted later in the article.

⁶According to the Moscow Home Service April 25th, 1959, 17,000,000 workers and employees are to be working either a 7 or 6 hour day from October 1st 1959.

had the 8 hour day been maintained, would probably have been the dismissal of some of the labor now employed.

Analytically, the most interesting facet of Kommunist's reminder of the continuing labor surplus in the cities (even in the second year of the demographic deficit period) is that it runs counter to the current Western theories on the subject. It will be recalled that one of the more persuasive of the various Western reactions to the Soviet claim that 12,000,000 more workers and employees would be found by 1965 argued that since only about 7,000,000 of these could be provided by demographic factors, the missing five million would have to be drawn from the countryside which, it was implied, would be so difficult as to cast a shadow of doubt on the plan's feasibility.⁷

The contrast between this ingenious theory and Kommunist's article is apparent: the Soviet source suggests that not only are two-thirds of the annual labor drafts normally found from the towns, in any case, but also that the Labor Reserves Administration is expecting to use the large industrial towns as its surplus labor pool for the development of the underpopulated areas. The word surplus, it should be noted is not here used in any arbitrary sense. The Russian textual phrase in Kommunist, izlishki trudovykh resursov, means exactly that.

Moreover, the theory that the missing 5,000,000 for the 7 year plan could only with difficulty be found from the countryside had from the start overlooked the historic flight from the land. According to the 1959 census results announced by Tass on May 9th, there are now 39,400,000 more urban residents than in 1939. Hence the urban population has for 20 years grown at the rate of almost 2,000,000 a year. On this basis, it is reasonable to assume that during the next seven years the regime's problem will be rather to restrict the number of peasants coming to the towns to the 5,000,000 figure than to encourage the process.

Bordadyn and his colleague are not satisfied with the present labor agreements contracted with individual workers before they are sent to the remoter raions. At present they are valid for only 1-2 years, and the working conditions on the periphery are so primitive that few workers agree to renew their contracts, leading to the high turnover which is the perennial curse of the building and mining industries in particular. Bordadyn now suggests that agreements should be concluded for longer periods, the aim apparently being to encourage unskilled construction workers to learn an industrial trade part-time and then take a job in the factory they have built on its completion. Thus not only would turnover be reduced, but the recruiting prospects of the building industry would be appreciably enhanced. However, it is distinctly improbable that many workers will wish to sign contracts for long periods in such climates.

⁷ See Christian Science Monitor, 9th April 1959.

Labor Reserves Administration Planning

An unusually informative paragraph in Bordadyn's article reads as follows:

"In connection with the reform of national education, those graduating from the 8th grade of the general schools will be sent into production. During the 7 year plan 14.8 million people will be subjected to vocational training and the provision of jobs. In 1959, 1,400,000⁸ pupils graduated from the secondary schools, of whom 175,000 are to be accepted into the urban and rural vocational-technical institutes which are now being organized (over and above the usual admissions to the labor reserves institutes). In future the admission of pupils will increase evenly so that by 1965 the majority of those graduating from the 8th classes will enter full-time vocational-technical institutes."

One may well ask why, in a year of theoretical labor shortage, it was found necessary to send more than 10% of the 10 year school graduates on for further training, rather than straight into production.

Bordadyn's plans for the development of his empire appear to be highly ambitious. He states that by the end of the 7 year program 5,000 new urban and rural vocational-technical schools, each for 400 people, are to be established, apart from the reorganization of the existing labor reserve schools. It seems most improbable that such an extensive scheme could be carried through at a time when the higher priority general educational schools are to be expanded so fast, but nevertheless the intention should be noted.

In the broad field of agriculture, Bordadyn states that his organization plans to produce up to 500,000 graduates a year from its rural vocational-technical schools by 1965. For purposes of comparison the 1958 plan for Labor Reserves agricultural schools provided for 250,000 graduates, so that the increased attention to be paid to rural requirements in the future seems beyond question.

Polytechnical Education

Finally the Kommunist article ends with a fair summary of the present teething problems afflicting polytechnical education in its initial stage:

"The first steps have been taken for drawing school children into productive labor. But the trouble is that the work of schoolchildren in the factories, on the Kolkhozy, and RTS is not yet sufficiently tied in with general education. Many schools lack the necessary technical equipment,

⁸ 200,000 fewer than in 1958.

and are short of teachers of vocational subjects. Such an important problem as the allocation of work places in industrial enterprises to pupils has not yet been solved: as a rule the factories do not provide a sufficient number of work places for the schoolchildren of the 8th-10th grades."

In considering this statement it must be remembered that in many cases the schools are providing polytechnical training either in their own workshops, or in special training shops at the factories which are divorced from the production lines. This is understandable, since it would be impossible to maintain an optimum output rate in the main shops if much of the work were being done by unqualified schoolchildren, each of whom was only present on two days a week. Consideration of the drawbacks of the scheme, added to the need to allot qualified workers as instructors to the children,⁹ is no doubt the explanation for the slowness of factories to provide work places of which Bordadyn complains.

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⁹See Trud, 2 September 1959.

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SCIENTIFIC AND TECHNOLOGICAL TRAINING AND MANPOWER IN
THE USSR

Nato
13 May 1959
by C.S.R. Manders

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- I. Introduction
- II. Some factors contributing to rapid advances in training under the Soviet regime.
- III. The educational ladder
- IV. The trained manpower reserves of the USSR and rates of production
- V. Difficulties and defects.
- VI. Disciplines of defence interest.
- VII. Conclusions

I. Introduction.

1. When the Soviet Union came into being just over 40 years ago the country had to face enormous difficulties. The South Russian harvest had been devastated by a locust plague so that food was scarce and morale low. For defence there was little more that could be offered other than an intelligent use of terrain and climate. In education and other social services the country was backward, illiteracy was widespread and no more than ten years since relevant figures were still quoted in Soviet journals and press. The supply forty years ago of trained personnel to lead the Soviet people out of their difficulties was apparently hopelessly inadequate, yet today the USSR challenges the USA for world supremacy. This achievement is one that bears comparison with any of modern times.

II. Some Factors Contributing to Rapid Advances in training under the Soviet Regime.

2. Naturally a whole host of factors has contributed to the Soviet advances of the past forty years, and those chosen for mention here represent but a small fraction that could be considered. Although this paper has been written with training in science and technology in mind, much of it could have been written equally well with respect to some other field of endeavor. In many ways, Soviet practice differs from that in Western countries, where conspicuously successful attention is drawn in this paper to those differences.

(i) Leaders qualified in science and technology.

From the first it has been clearly realized by the Soviet leaders that science and technology are essential means of achieving communist military and economic aims. With this emphasis over forty years on science and technology, these disciplines are well represented in the background training of the present Soviet leaders. The President of the Academy of Sciences of the USSR is an ex-officio member of the Presidium, a body to be compared with the cabinet of the British Prime Minister or the cabinet of the French President du Conseil. All told 39 out of the 67 members of this body are technically or scientifically qualified. Again, the first deputy-Chairman and 9 out of the remaining 13 deputy-chairmen of the Council of

Ministers possess scientific or technological qualifications. At top administrative level in the USSR scientific and technological projects may be expected to receive an easier passage than in Western countries.

(ii) Central control and planning.

These offer obvious advantages for achieving maximum efficiency in a training programme. Uniform standards can be set for the whole country, the system of training can be simplified and much of what is confusing in Western countries, where the system has grown piecemeal, can be eliminated. If planning and production keep in step, there should be no unemployed but people with the right qualifications should be available for all the jobs that the State needs doing. With a centralized system, of course, there exist the possibilities of being gloriously right or disastrously wrong. The essentials of the Soviet method are - Ministries forecast their requirements in materials and manpower for a 5 (now 7) year plan in response to an overall directive from the Party executive. These stated requirements of Ministries, modified slightly each year in the light of experience, are collated and plans drawn up by the State Planning Commission. The scientific and technological parts of the Plan are vetted by the Academy of Sciences.

(iii) Newly trained manpower at the disposal of the State

Nearly all who train in the Soviet Union beyond the legal minimum stage receive public funds in order to do so. The State requires that such people, professionals and semi-professional alike, shall serve in posts to which they are allotted for a period of three years after completing training. Some 750,000 professional and 1,200,000 semi-professionals, in the main young folk without a load of other commitments, can be readily switched to the solution of the state's priority problems such as the great development schemes, teaching and the like. This group of nearly 2 million workers does not constitute a sweated labor force, individuals are paid the "rate for the job", and moreover, military service is not required of them.

(iv) "Small" subjects

The USSR is a large country, thus it is able to produce a study group, and cater for it adequately, for such subjects as gyro engineering, boiler engineering where many Western countries could only arrange an occasional course, on account of small numbers and that of an extremely compromise nature.

(v) Combing of Western sources

Western publications are available in translation in the main Soviet establishments within about 2 months of original publication. The Academy's Institute of Scientific Information provides the finest and most complete abstracting service in the world. When circumstances require it, the Soviets are ready to acquire information through espionage.

(vi) Ploughing back

Over the years a generous proportion of the personnel trained has been ploughed back into teaching in order to train

more specialists. Pay and prestige in teaching are good. The net annual increase in the body of trained personnel is currently 7% in the USSR (cf USA 3 1/2%, UK 2 1/2 -3%)

(vii) Strong basic subjects.

Of recent years at any rate, there has been undoubted insistence on strong basic subjects in all the courses offered in the Soviet Union. All 200 of the technology curricula followed in higher educational establishments devote approximately 10% of the time to advanced mathematics and a similar amount to physics. The large trained manpower reserve and the rapid technological progress have not been obtained by indulging in superficiality.

(viii) Teacher-training programmes a first priority.

With each foreshadowed technological or scientific advance there is initiated an appropriate teach-training programme. Teachers of programming have been trained since 1955 in Moscow State University.

(ix) Efficient propaganda

In the West it is not unusual for Soviet propaganda and lies to be regarded as synonymous. Propaganda does succeed in keeping the national targets before the Soviet people so that they are pleased and excited as these are knocked off. Again there are posts in the USSR people might not be keen to fill, places where people might not be keen to go to work. Propaganda in the educational establishments presenting these posts and places as a challenge produces many of the young folk of (iii) eager to work for their country in the less favored conditions.

III. The Soviet Educational Ladder

4...Formal education in the Soviet Union begins at 7 years of age and the primary stage lasts 7 years. By 1960 the last 5-year plan aimed to make 10-year school available overall. Where 10-year school could be provided such training was made compulsory by local regulation, in consequence of which the numbers graduating from 10-year school rose during the last five-year plan from 440,000 to 1,500,000 per annum. Boys and girls alike follow the same course in the 7- and 10-year schools. In the secondary stage of academic training, i.e. the eight, ninth, tenth grades of 10-year school, pupils spend 42% of their time on mathematics, physics and chemistry. The product obtained from the 10-year school is not so highly trained as the product of the Science Sixth of a British grammar school or the young man or woman with a Science 2nd bachot of a French lycée. A far higher average level in science is, however, attained by all who complete 10-year school training in the USSR, and by vastly larger numbers of pupils, than is the case in the West.

5. It has been possible to go out into paid employment but the numbers doing so dropped sharply during the last 5-year plan. The labor reserve schools are run in association with industries and agriculture. The specialist secondary schools, mostly Tekhnikums provided by appropriate Ministries, give semi-professional training in some 2,000+ specialities, the courses being of strongly practical character.

6. Of recent years some 40% of the 10-year school output, together with a lesser percentage from the semi-professional schools has been going on to some form of higher educational establishment and there has been talk of raising the percentage to 70. Universities provide only 10% of the trained manpower of the Soviet Union and instruction in them is given in the basic subjects only. Pedagogical institute courses last 4 years, basic subjects in universities (physics excepted) last 5 years. Most of the courses in technology (also physics) last 5 years, while medicine is a 6-year course. For all courses but those in pedagogy the student has to carry out a 6-month diploma project, the account of the research being embodied in a dissertation that is defended in public. About 1 in 6 or 7 people from the higher educational establishments proceed to higher studies. Students, aspirants and doktorants are required to develop competence in one, two or three foreign languages respectively.

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IV. Manpower reserves and Production Rates

8...In the USSR those trained in science and technology tend to remain in those fields. Prestige and rewards are high in these fields, particularly for teaching.

9. At higher degree level the USSR is not going to be starved of men qualified to direct the country's projects. At higher education and school level there is every indication that the outputs of trained personnel can be not only maintained without difficulty, but even stepped up.

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V. Defects and Difficulties

11. The Soviet training system with some 35 million people studying at its various levels is gigantic. One of its outstanding merits, stemming from central control and planning, is its relative simplicity. It may be of interest to note how the Soviet Union has fared in coping with problems that have dogged Western countries.

(i) Accommodation

At all levels in Soviet schools a 2-shift per day system is normal and a 3-shift system not unheard of. The provision of classroom, lecture-theatre and laboratory space is undoubtedly the most severe problem with which Soviet training has to cope. The shortfall in its building programme was one of the factors contributing to the abandonment of the last five-year plan. It was almost certainly a factor precipitating the modifications in the educational system at secondary level. There is talk of all candidates for higher education being required to put in two years of industrial service before going on - a two-year breathing space would enable the building programme to catch up.

(ii) Equipment

Western observers generally have been envious of the quantity and quality of equipment in Soviet training establishments.

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(iii) Staff-student ratio

The Soviet Union, as mentioned earlier, has no teacher problem, whereas in most Western countries the position is far from happy.

	<u>USSR</u>	<u>USA</u>	<u>UK</u>
Higher educational establishments	1-12.6	1-14.1	1-9
	1-17.6	{ 1-21 (second.) 1-30 (prim.)	{ 1-18.1 (sec. gramm) 1-22.3 (sec. mod.) 1-30.5 (prim.)

(iv) Military Service

In the USSR for reasons given earlier, this is no problem at all.

(v) Ratio of professionals to semi-professionals

Western experience seems to indicate that one professional should be supported by three semi-professionals and in the major Soviet establishments visited by Western observers this ratio appears to be commonly adopted. The 3 to 1 ratio is not the training ratio so it appears that somewhere in the USSR there must be a shortage of semi-professionals with presumably difficulties in consequence. The fact that difficulties are not obvious suggests that professionals may be being used in the USSR at levels that would be considered uneconomic in the West.

VI. Disciplines of Defence Interest

(i) Mathematics

(12) This is the subject in the USSR which enjoys highest prestige. The country has a first-class mathematical tradition and the current level of mathematics in the Soviet Union is second to that of the United States alone. When examining a bunch of Soviet scientific papers, more especially in the physical sciences or engineering, it is very noticeable how satisfying it appears to be to the Soviet scientist to trail off into mathematics. British papers often consist of two parts, one part theory and the second part giving an account of experimented verification of the theory. Often a Soviet paper will give theory only.

Top-notch Soviet mathematicians play a much bigger role than Western counterparts in engineering conferences of quite "oily-rag level." This scientific approach to engineering problems may possibly account for part of the rapid progress in this field. Soviet mathematicians appear somewhat ready to fit mathematical theory to quite small-scale experiments. They also appear unusually confident in extrapolating into regions where Western workers would regard supplementary experimental data as essential. When the Soviet method succeeds it does enable certain stages of a development to be dispensed with. Doubtless much of recent Soviet advance in aerodynamics and chemical engineering is due to taking mathematicians' advice.

Mathematics again is strongly encouraged in the schools.

Olympiads, mathematical contests for the 8-9-10th grades of 10 year school, are held on town, regional, republican and national bases. The exceptionally able pupil is spotted at a very early stage and he/she can be appropriately nurtured thereafter.

In most countries there is an obvious vertical structure in scientific disciplines and a vertical hierarchy among the workers. This makes for weakness in transfer of ideas between disciplines. In the USSR mathematics is the active agent in cross-fertilization between disciplines. A noteworthy example of this is provided by the Vibrations Laboratory of the Lebedev Physics Institute of the Academy of Sciences of the USSR. The laboratory is a research organization but, in addition, members who it is presumed attend this Moscow laboratory for one or two months per annum, are to be found in institutions all over the Union. These members are leaders in a wide range of subjects - astronomy, radio astronomy, spectroscopy, acoustics, theoretical physics, machine tool engineering, marine hydrology, electric power engineering and many other fields - and the only common factor is their interest in wave motion. The possibilities in the way of carry-over of ideas in the Vibrations Laboratory are clearly enormous.

(ii) Physics

Soviet workers in this subject are up with the world leaders on practically every topic. Great strength is shown in theoretical physics whilst the last five years has seen spectacular advances in the USSR in semi-conductor research...

(iii) Chemistry

Here is a subject where the USSR is described as being somewhat pre-war in outlook though too much should not be made of this point. In chemical engineering the Soviet Union is also backward, but this position is clearly recognized and there is currently a drive in this field...

(iv) Engineering

(There is a) generous allotment of time for higher mathematics and physics. Again, time is allowed for industrial practical work. With an expanding economy based on growing industrialization engineering in the Soviet Union enjoys high priority. In 1958-9 it is planned to have an output of engineers three times that of the United States. It may well be that indications of a saturation state will soon become apparent.

VII. Conclusions

13. There is a considerable tendency in the West to adopt extreme views concerning the Soviet Union. Its peoples are, however, neither supermen nor inferior material, but are in fact people with the same range of abilities and emotions as any other. If 210 million people in the West will work together with the same priorities and the same intensity as their counterparts in the Soviet Union they will achieve similar results. Nations competing individually with the USSR fritter away their energies and resources in efforts foredoomed to failure. If methods superior to those

of the USSR cannot be thought up continuously then serious thought may have to be given to the adoption and adaptation of Soviet methods. This could easily involve, among other things:

- (i) the abandonment of cherished, traditional ideas about women;
- (ii) A demand for service to the State from those who have received aid from public funds for training beyond the legal minimum stage;
- (iii) abolition of a "free market" in trained personnel and the acceptance of some, and probably increasing measure of direction by the State.

14. Whatever happens, any country now experiencing a teacher supply problem must solve it as a first and urgent priority.