"COMRADE COMPUTER"

THE RUSSIAN COMPUTER TODAY

SOVIET PLANS FOR FUTURE APPLICATIONS

THE OUTLOOK -- AMERICA VS. RUSSIA

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Russia's start in the field of electronic data processing has been slow. One reason is that the computer is an American invention. And, although the Russians were very much interested in it from the start -- they tried to order an ENIAC immediately after it was announced in 1946 -- the United States was wise enough not to hand computer blueprints to the Russians on a silver platter. But, on the other hand, since we regard the computer as an economic tool, the U.S. follows an almost completely open policy on publication of computer art in this country. As a result, the USSR has made better progress with their computers in recent years.

Of late, others in the Western World have taken actions which cannot be construed as intended to maintain a favorable computer gap. The English, as is generally known, have sold the Russians large scale electronic computers.

Since Russia has clearly had access to the world's computer technology, one might ask why that nation has not made greater strides with the computer today. But before answering that question let us take a look at where Russia does stand today.

In my opinion, looking at the over-all picture, Russia is at least three years behind the United States at this time in the area of electronic computers. Two years ago they were about five years behind. In the data processing field their lag is greater than these figures would indicate.

The quality of the Russian computer is probably best described by repeating the pungent opinion of those Americans who have visited the USSR. None has found a Russian data processing system they wanted to bring home. Furthermore, no one has been able to find a single significant computer invention which can be attributed to the Russians. Or, to carry this a step further, no one has found ideas -- except for certain work in mathematics -- of real value in this field for which the Russians are entitled to credit. However, even in their mathematical work, we frequently have been the first to put their methods to practical use.

In 1949, the Russians started work on MESM, a digital computer. They had built one MESM in late 1951. However, it was not a production model. At the end of 1952 they came out with their first high-speed digital computer, BESM. It was not a production model either. UNIVAC, finished in 1951, was a production model and was immediately produced in quantity. The Russians, at that

time, were still in the phase of producing single experimental computers.

At present there are between 600 and 800 electronic computers in the Soviet Union compared to 8,000 or 10,000 at work in the United States, depending on just how you define a computer. It should be noted, however, that nearly half of our computers are capable of the big, the complex jobs, while the majority of the 600 to 800 Russian systems can only deal with more restricted and generally simpler problems. Practically all of these Russian systems still rely on vacuum tubes instead of solid state devices; their peripherals -- tape and printing devices, for example, -- would be considered inadequate and obsolete by American standards.

The Russians have the URAL I's. These are machines similar to IBM 650's. They have the URAL II's. These are slower than UNIVAC Solid State Computers and must rely on those unreliable vacuum tubes. The M-3, another machine on the Russian market, still uses standard radio components. They introduced the M-20 last year and it is estimated there may be 20 to 30 of them in operation. The M-20 is about on a par with the speed of the computer the United States uses in the SAGE system; however, we have hundreds of computers here which equal or exceed the SAGE capability.

The M-20 appears to be capable of handling 20,000 operations a second. This is considered the Soviet's best "serial production" machine. "Serial production", incidentally, is their way of saying mass production.

A much smaller machine also in "serial production" is known as the MINSK. The MINSK is not a very capable machine. Interestingly enough, Russian literature frequently refers to their computers as "weapons." We generally describe our computers as tools.

In addition to Russian-made equipment found in the USSR there are a number of Elliott 803's, a British product, and some Bull Company equipment from France. At the end of World War II, the Soviets picked up a considerable amount of foreign, punch card equipment from countries they occupied. Some of this was from the United States. But so far as we know, outside of the old punch-card systems, the Soviets are not benefitting today by use of American equipment.

In characterizing Russian computing equipment today, I believe the following are the significant points. Russian equipment is capable of only numerical input, and therefore its use in accounting and economic planning as opposed to scientific use

is hampered. An inadequate supply of punch cards also hurts them, although last year they built a plant to make more cards. However, their Latvian production facility for producing perforated paper forms will not be ready until 1963 or 1964. Therefore, any new punch card equipment cannot be fully effective until then. Russian electronic computers rely on rather small high-speed memories. In the M-20, for example, we find a memory capacity of only 4,096 words. All Russian equipment shows evidence of a decided lag in the use of advanced components. Therefore, the performance and reliability of this equipment is far short of what you and I have come to expect. In Russia the vital peripherals are very limited. It seems that so far they have largely overlooked the development of high-speed tapes and printers. As a result of a lack of adequate peripherals their data processing is severely inhibited.

In the past -- and we have every reason to expect this to continue into the foreseeable future -- the majority of Russian computers have been allocated on a priority basis. To evaluate Russian computer priority has not been difficult. One simply had to turn on his radio or TV set. The answer became apparent when we first heard of a device called Sputnik. It was reinforced

by a Titov, a Gargarin and a dramatically successful hit on the moon. But, even this does not change the outlook in comparison to Russia in computer development today. You and I know that one does not need many computers or really fast computers to score spectacular successes in space. Nor does one need particularly capable, extensive or general purpose input-output equipment. However, the important deduction we can make from this is that, in the past, the Russians were not interested in the economic application of computers and they did not recognize the true nature of their over-all planning problem. Nor do they yet, perhaps, realize how vital a part computers must ultimately play in a system such as theirs if it is not to breakdown completely.

In this we see a typical weakness of the Communistic ideology. The scientists, and particularly the economists in Russia, are the most reactionary group in the world. They now want the improvements which the electronic computer can offer but they aren't willing to change anything to get them.

In contrast, we in this country have been willing to accept many changes in business procedures to benefit from electronic data processing. It is fair to say that the Russian Communist is far to the right of McKinley. The Communist bureaucrat must

satisfy many conditions before using data processing in Russia. Whatever he does must rest on the unshakable basis of Marxist-Leninist economic theory. According to the Russian interpretation of this theory up until a few years ago, mathematical logic was out. It could indeed contradict their theory. Kantorovich, who invented linear programming over 20 years ago, is being lambasted today because his recent economic thinking seems to the Russians no more than a mathematical description of capitalism. And in Russia, one must be not only consistent with the ideology but must also be consistent with the methods of Soviet statisticians and the methods of calculation and of academicians like V. Nemchinov.

And now, by a simple comparison, I can indicate to you the magnitude of the data processing problem the Russians are failing to handle.

Let's examine an area in which the electronic computer has made a significant contribution in the United States. Then let's look at a similar problem now developing in the USSR.

Even in the United States the electronic computer has only been able to stem the tide of paper work. But it has taken more than ten years. Back in 1950, 40 per cent of our labor force was engaged in clerical work. By 1960, this figure had increased by

11 per cent to 51 per cent. Last year, the computer was able to hold this increase to 11 per cent. It was the first time in more than a decade that no increase was seen in the percentage of people required to keep track of what other people are doing in this country. With our continued population growth -- and the fact that more people generate more paper work -- and the ever growing complexity of Government, trade unionism, and business today, just to be able to stem this tide is a major achievement. It means that more people are free to do the meaningful work of the future. This is the result of having superior computers and using them in a sophisticated way. This is the result of being Americans who as part of the Free World can think freely and adapt to vital change quickly.

Things are lagging in Russia. The amount of paper work there still is on the rise. As a matter of fact, The Computer Center at the Ukrainian Academy of Science in Kiev recently simulated the problem of administrative planning for the USSR. The conclusion reached was that, unless administrative procedures are changed before 1981, 100% of the adults in Russia will be required to perform the administrative function. Actually, between 1954 and 1961 the number of people in Russia required to handle accounting

and statistical work alone increased by 30 per cent, according to Sazonov, deputy chief of the Central Statistical Administration. This is not surprising, for less than 10 per cent of Russia's clerical work is mechanized at this time even to the point of using simple desk adding machines. They are short of typewriters, drafting equipment and copying machines. The dictaphone is almost unheard of there. There is even a shortage of office furniture. Obviously it's not enough to say that the Russians will have to get better electronic data processing systems and improve their ability to use them.

One might feel, from what I have said thus far, that from the standpoint of the United States, the picture is rosy. I suppose it is. But one still must ask several questions.

First, is Russia finally beginning to understand its problems? If so, we can certainly expect a big, an almost desperate, push by the Soviets in the field of electronic data processing.

Second, if this takes place, can Mr. Khrushchev keep his promise to bury us -- economically at least?

The Russian prediction is to have 1,500 computers by 1965. Even if they achieve this goal in 1965, Russia will still be far behind the United States today, but the drive will be started.

Therefore, now is the time to face the fact that we cannot let up in our efforts if we expect to maintain the lead.

Russia does have factors on its side in attempting to gain the most for its economy with this new tool of science.

Science, and particularly computing science in the Soviet Union, is the prestige field. The scientist in Russia has the prestige of the movie star here. Their pay is at the top of the scale. Their living accommodations are the finest. The top box office attraction in Russia is the academician. Keltish, for example, current President of the Academy of Science, the most coveted scientific position in all the USSR, is a hero to the people. His work is closely allied with the computer field.

I cannot help but think, when I learn these things, what it was like in my early years. Interested in science, it was not always easy for me as a child; for my contemporaries scorned those who were interested in such a dry and dull subject. In high school I was called the 'prof." Needless to say, this nickname was not particularly meant to flatter me.

The people of the past generation hardly realized there were such things as scientific professions, and my parents were not exceptions. They urged me to study business administation at the

University of Pennsylvania.

Unfortunately, even with the publicity given scientific achievements today, the situation has not greatly improved. Last year there was another decrease in the enrollment of American students for engineering courses.

I think that having an extremely favorable attitude toward science and scientists is a decided plus for the Russians.

A typical head of a data processing group in the Soviet Union is found to be a very young man. He most likely is in his early 30's and just a few years out of school. Let us take Ivan Petersen, for example. He is head of the computing center at the Institute of Cybernetics of the Estonian Academy of Science. Ivan Petersen received his degree from Tartu Polytech Institute in Estonia just two years ago. Most of the men working with him are under 30 years of age, and what they lack in experience they make up in enthusiasm and imagination. After all, those who do the best job for Ivan Petersen will be rewarded with bonuses, better benefits, even a better vacation cottage. Ivan's colleagues will do their best. If any of them fail, there are plenty more like them who want a chance in this new romantic field. All of this would lead us to believe that it is possible for them to do the same job in economics

that they are doing in the field of science. Leningrad and Moscow Universities and the Moscow State Economic Institute have already begun to train specialists in this field.

Russians have shown a decided eagerness to visit U.S. data processing and computer manufacturing facilities. They have a tremendous interest in what we are doing in this field. As you know, the United States, Russia and many other countries, have a cultural agreement whereby, in the field of science, either country can propose to send people to observe what the other is doing. This exchange has made it impractical for us even to consider maintaining a lead through secrecy. Therefore, we maintain our lead by using computers in every way we can to advance the life in which we believe.

Some feel that Russia's ability to collect its input data in a standardized and forceful way and to control from computer output by fiat may also give them an advantage. This is not obvious and remains to be seen.

What are they lacking? The USSR is woefully behind the United States in the techniques of mass production. Despite their apparent great belief in automation and mechanization, they are still having difficulty making the transition from hand-made, hand-adjusted

equipment at universities or research institutes to equipment suitable for mass production. The phases of design, engineering and documentation are almost completely unmechanized in Russia. The Soviet Union, which until just a few years ago thought that the art of mass production in the United States was classified "secret", still has been unable to develop the legions of technicians needed to supplement the production line for the mass production of the complex systems of modern engineering. They don't have the necessary number of all important electronic test technicians, or the specialists in core testing, or magnetic head construction and magnetic tape production. And those they have are not yet co-ordinated, or managed, to produce massively. As we all realize, in the United States a single new scientific development can be exploited commercially with great speed. In the Soviet Union, however, such has never been the case.

Another major hurdle that the Russians have faced in industrial computer development is their own red tape. In a centrally controlled government the economy soon is out of control if the government does not maintain a tight system of checks and balances. This is because they cannot rely on the natural self-regulation of a competitive economy such as ours. Having an

artificially regulated economy demands that these checks and balances be repeated perpetually, piling red tape on top of red tape.

A. I. Berg, chairman of the Soviet Council for Cybernetics, is worth quoting about this problem. Berg declares: "The management of the national economy is a continuous process, ever demanding fresh information. But processed and systematized information about the state of the national economy is only obtainable after a delay, perhaps of several months... The central state apparatus takes six to seven months to work out the annual plan for the development of the national economy."

Because of this, the kind of performance we know, expect and demand here, has been out of the question there.

Russia faces a mammoth problem in economic planning. In the past, the extensive planning required for the Soviet economy has been handled by the simple expedient of completely ignoring many areas of needs. Much of their economists' efforts are directed toward a few high priority items. If we compare the economic situation in the United States with the economic planning problems in Russia, it is possible to get an idea of just how great this problem is.

Actually, in the United States, our various industries face a largely analytical problem. For example, a steel manufacturer's products usually prove to be as good as his competitors'. However, they may not be selling as well. That manufacturer analyzes the problem. He may decide that he will have to cut prices or increase his marketing budget to get back into the contest. As we can see, he has only to analyze the problem and come up with a solution to a comparatively restricted problem. It usually doesn't take much invention or synthesis to bring about corrective measures once he has found out what is wrong. Nor is his problem usually a very extensive one involving the multitude of factors that must be taken into account in the central planning of the entire economy of an empire. As a rule, he only has to take into account certain areas of the country, limited competition and selected customers. The steel company executive worries about his own costs and profits. He does not have to worry about the costs and profits of those who supply him. He merely makes certain their price is the best he can get. General Electric had an empire less complex than the Soviet economy and yet a few years ago they found that to manage it required breaking it into over one hundred divisions now held together only by a financial structure and a

central basic research organization.

In Russia, where the government has the central control of the economy, their entire concept of economics must be a synthetic one. The Communist must find a way to decide what the over-all need for steel is. Then he must try to produce this amount of steel. At the same time he is setting the price of steel, he must determine the costs faced by other suppliers and how much they must receive to continue operating. And all of these things must maintain a certain inter-consistency so that all of the various economic factors are held in balance. After all, the Russian Communist is supposed to operate a totally planned economy. His word world is composed of such descriptions as "accumulation in the national economy", meaning capital; "gross social product", in place of gross national product, and "inter branch balances", "national and technical coefficients", and "balance of labor resources and labor force." In an inherently artificial and unstable system like this, without the natural laws of supply and demand at work, it is very easy to overproduce one product and underproduce another, or to overwork one segment or one area of the population, while others are under employed.

A Russian economic planning expert, discussing the problems involved with pig iron production for pricing of a line of "low-displacement automobiles" -- better known as compact cars to us in the United States -- explained that both the required mathematics and computing machinery needed for his calculations had been invented. He added that he hoped these services would soon be available. He explained, and I quote:

"Theoretically the solution of such a system of equations does not present any difficulties, but in any given case there are several thousands of equations. This requires dozens and even hundreds of millions of interconnected calculating operations, and it is impossible to cope with them by regular methods. With the help of electronic computers such calculations can be performed in a short time."

Of course, this is merely his requirement for price balancing. Next comes the more complex problem of figuring the labor balance.

Let us consider just how bad their present situation is. Until 1959, just three years ago, the Soviet central planners tried to draw up detailed production schedules and inventories for nearly 7,000 products.

At this point the Kremlin planners fell so far behind that they cut the central list to less than 1,500 products. The fate of the rest was left to local officials. But still the statisticians could only compute schedules and inventories for 700 or so commodities!

There have been recent reports that the USSR is planning to automate all of their operations through use of a few centrally located giant computers. Looking at their past data processing record, I don't think I'm going to lose any sleep over this propaganda.

Working under the Communistic system, more effective techniques for synthesizing than the Monte Carlo method must be invented. It is really a trial and error technique and, even with nano second computers of the future, not a really good synthesis tool. The need for synthesis has not been so great in the more natural self-regulating capitalistic economies; perhaps this is why more powerful synthesis techniques have not been developed. The Russians are faced with a tougher problem than usual. They not only have to mass produce computers and mass train people to use them, they also will have to invent more powerful approaches because they cannot in economic matters simply copy the capitalistic

countries as they have in engineering and other scientific fields.

We might make an analogy between our capitalistic economic system and Russia's controlled economy by thinking of the former as an airplane and the latter as a helicopter. An airplane is for the most part stable; if the pilot steps away from the controls, it will continue flying for a reasonable period of time. A helicopter, on the other hand, must be flown all the time. This is because it has so many modes of operation -- or shall we call them degrees of freedom for the engineers here tonight -- that an unstable situation can easily occur. This is the same situation that exists with a planned economy. Let it go for a minute and one may not be able to avoid the crash -- of course one may be able to deny it, or blame it on an expendable comrade.

In the light of these obstacles, I find it hard to put much stock in the program adopted by the 22nd Congress of the Communist Party of the Soviet Union. That program asserted that within the "current 10 years" industrial output there would be increased 150 per cent, exceeding the level of U.S. output. And, within 20 years, it would be "exceeded by not less than 500 per cent, leaving the present over-all volume of U.S. output far behind." The CPSU admitted that to achieve these goals it would be necessary to raise

the productivity of labor in industry by more than 100 per cent within 10 years and 300-350 per cent, within 20 years.

Even in the application of computers for simple tasks, the USSR is facing problems today that we left behind us years ago. For example, a data processing system was installed in a metallurgical plant there a little over a year ago. The Russian in charge of this new system complained repeatedly that he had nothing for it to do. The engineers at the metallurgical plant had no idea of how to take advantage of the computer made available to them. Five to ten years ago, it was hard for some U.S. companies to keep a UNIVAC I busy. Today, our customers who order UNIVAC III's expect to keep them busy every working hour. A UNIVAC III is equal to twenty UNIVAC I's.

You can summarize all this by saying, "Russia just isn't so hot in the electronic data processing field."

They don't have the computers. They don't have the trained personnel. They don't have the mathematics to fit the enormity of their problem. They don't even have the feel of the problem yet. Actually, in economic planning they are trying to learn to run before learning to walk. Of course, they have found out that running before walking results in a lot of flops. But, instead of

stopping and learning how to walk first, they've tried to invent "slow running." That is, they attempt by oversimplifying to ignore parts of the basic problem which are too complex. They are just beginning to learn that mass production isn't a capitalistic trade secret; that it is a matter of hard work and long training and the development of a sense for this kind of operation. In other words, the Russians are trying to live beyond their technological income.

In the United States we have tried to develop the technology as rapidly as possible to meet our needs and then apply our ideas as widely as possible. Wonderfully, the electronic computer is much more suited to the needs of the United States at this time than it is to the needs of the USSR. We have economic problems which are manageable with available techniques. Their problems are not manageable by any known techniques. By continued wise use of our computers we should make advances by analyzing where we are going and selecting the best alternatives open to us. When we have reached the point in analysis and planning where we can handle many of our objectives with a reasonable degree of certainty, happily our governmental system is one with enough flexibility to allow us to take advantage of such progress.

I believe the following eight points are worth remembering when we consider Russia's standing in this field:

Russia's start in electronic data processing was slow and they are at least three years behind us in the area of electronic computers.

There are ten times as many electronic computers at work in the U.S. as there are in the U.S.S.R.

Russian electronic computing equipment is inadequate and obsolete by American standards.

Russia's successes in space, while spectacular, have not required many computers or really fast computers. On the other hand, Russia's economic planning does require fast computers and fast computers are unavailable there.

The Russian Communist, actually an extreme conservative, resists the very changes which he must make if he wants to improve his data processing performance. His actions must rest on the unshakeable basis of Marxist-Leninist economic theory. Because of this and other encumberances, until

a few years ago even mathematical logic was out.

The fact that science is the prestige field in Russia is the one advantage they have over the United States in the computer area.

The Russians still find it difficult to bring about transistion from hand-made computers to units suitable for mass production.

The electronic computer is much more suited to helping solve America's economic problems than the problems of the Soviet's centrally controlled economy.

The marvelous virtue of the capitalistic system is that, after living with it, one recognizes that it is not necessary to control everything in the world in order to survive. The Communistic system, epitomized in their ambitions for a planned economy, displays their feeling that they must control everything in order to survive. When and if the Communists see the folly of trying to plan a total economy, can we help them to the realization that it is not necessary to control the world to survive.

Start new sheet

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In 1962 I wrote a paper called "Comrade Computer" which discussed the Russian computer art at that time as well as some of the ramifications of their computer problems. I would like to quote a few paragraphs from that paper. "Whatever the Communist bureaucrat....." 1, 2, 3 quotes

Over a year after I wrote this paper I received a translation from a friend in Germany of an article issued in the German magazine Der Spiegel, dated November 13, 1963, entitled "Electronic Brains Defeat Dogma", The Communist Reformation by Georg Paloczi-Horvath. "The exile, Hungarian and Biographer of....."

This paper goes on to discuss some of the behind the scenes actions that caused Russia to begin to give up its central planning in 1959 and, as you all know, since then to start putting some of their factories on a profit system more like our own.

You will remember ~~that~~ I mentioned Kantorovich, the inventor of linear programming, ~~who was lambasted as being~~ like the vulgar bourgeois economists ~~and a man who was still in some disrepute for his views when I wrote the paper in 1962~~. It is interesting to note an article published in the New York Times, April 22, 1965, entitled, "Soviet Rebuff to Marxists Seen In Award to Reform Economists." I would like to quote part of this article: "The Soviet Union's ....."

in my 1962 pape

He then being Russia's traditional economists then said was now Kantorvic.

The rising importance of computers to any kind of economic planning has been indicated ~~in other ways~~ in several articles by ~~different~~ Russians that have appeared recently in which they have suggested that Russia's need for computers is sufficiently great that they should purchase them from the Western Countries in order to

free up their facilities for other more important work. The truth of the matter, of course, is that they were at least five years behind us in 1962, especially in the commercial data processing and that the available information since then would indicate a greater(?) gap between their capability and ours, now. I think that public suggestion discussions about buying equipment from the West are really an open admission of this situation. The thing I find most interesting is that all this is related to large scale attempts to control through rules and regulations rather than through calculations and information. Attempts at economic planning to plan based on too little input data and too little calculating ability have been proven by the Russians unworkable.

On the other hand, I think we believe they have not proven that attempts to plan that with a computer, slowly and carefully, a few things at a time, learning to walk before we run, so to speak, planning is not our best avenue for the future. Certainly the problem of human population explosion and the needs it will bring down upon our future societies make some kind of planning more than we are presently capable of our greatest social need. We need social accounting.

not only in business but in politics and indeed that the very way in which out society is organized that I am beginning to believe more than I did 20 years ago when Dr. Mauchly and I finished the first computer that there is much more involved than I ever dreamed of. I do not mean just as regarding computers becoming a big business. They are already a big business and I always thought they would be but I am now beginning to wonder about what the really long range effects of all this will be. It is quite hard to talk about two aspects of this problem at the same time so let me first talk about what I see happening to computers themselves and then later after we have covered this, talk about what I feel its deeper implications may be. In other words the changes that were produced by computers rather than the changes in computers. Many people have used expressions like "last generation", "next generation", or "third generation" in discussing a particular line of computers, perhaps this makes a little sense when you are talking about a particular company or selling computers but it does not make much sense when you look at the overall development. I personally have been involved in one way or the other with 8 computer efforts including the original Eniac which was so different

in their technologies as regards how the memories or switching circuits were designed that they could be called 8 generations of computers and this has all taken place in a period of 23 years. However, changes in imput and output equipment have been somewhat slower and we have perhaps come through only 4 or 5 drastic changes in this area. Indeed, there is one area of input-output, the punch card, where the changes have been so slow that we are still using what might be called the second generation of equipment. Calculators have improved more than 100 to 1 since the Eniac of 20 years ago and the Eniac was already 1,000 timesfaster than the Harvard Mark I Calculator and more than 100,000 times faster than a man can calculate by hand. Thus, in a relatively short spand - a little more than 20 years - the ability to calculate has gone up 100 times a 100,000, or 10 million times over an unaided man. Since a man with A desk calculator or an adding machine is perhaps 10 times as fast as an unaided man we have so far achieved a just a million to 1 improvement in our machinery in a little over 20 years. Of course, there are many aspects to the problem such as the printing of information and the getting of information into the machine and in the problem of storing bulk information where the improvements have not been so dramatic. In printing we have only improved things a matter of about 10 to 1 with the exception of some special microfilm imprinters where the improvement is a few hundred times faster but where the application is limited. In putting data into the equipment we have made no real improvement at all except for certain limited situations where by we pass the data more directly from its origin to the computer than years ago and avoid intermediary steps. I am thinking of an airline imput terminal or a bank imput machine where information goes directly from the person at the window to the machine without having to be recopied by a key punch operator on the way. We have avoided some of the imput problem by returning information originally generated by the machine back to the machine through character recognition equipment but we are making only very indirect progress in this area. In the area of mass storage of information we have not made the million to one improvement we have made in calculation but we have to retrieve information from a file electronically

in papers 1/20 of a second that would have taken a clerk possibly a better part of a minute or more to find if they had to look through a series of file cabinets. Consequently, the problem of retrieving information at least 1,000 to 1 has been accomplished. In the next chart I show the kind of improvements we have made in the last 15 years. I have not gone back further than the last 15 years because I feel anything earlier was not representative because we were just getting started. I have defined performance as the speed improvement factor times the cost improvement factor. The first column of the chart shows four different categories of equipment found in a computing system, the sort of improvement factor that we have made in the last 15 years, Since most of these improvements have come about as a series of small improvement steps, I mention 8 in the case of computer circuitry, for example, and actually there were even more, It becomes reasonable to think of improvement as a continuous change over this period and furthermore since engineers do not redesign equipment unless they get a fair percentage improvement. Each time such improvement data tends to show a constant factor of improvement for every period of time. That is, you get a straight line if you plot the log rhythm of the improvement factor against time. In the second column of the chart I have shown the approximate factor of improvement for each 5 year period of the 15 year period in column 1, and finally in the last column of the chart I have shown the factor of improvement that I expect to see in the next five years. I don't like to make estimates farther than this because I won't be here to "face the music" if I am wrong, but I shy away from anything between 5 & 50 years. You will notice that in most cases I predict more progress in the next 5 years than for the equivalent periods in the last 15 years. Perhaps there is a little optimism but all the indications are that the progress is going to be as good as it has for the last 15 year or put another way that at least in the next five years there is no evidence that we are up against the limits yet. This is in considerable contrast to a business like the automobile business where, if you have been reading the papers lately about the construction of some of the cars, there are at least some people who feel

progress is not what it should have been. In any case, it will be more than 5 years from now before you buy a computer because you like the style of its case. It might be interesting at this point to be a little more specific. Let's first take the internal high speed memory. Most of you have possibly seen the Ferrite Core array used in modern computers. If you have not, they look something like a ladies beaded bag except that the beads are black and while the process of making these core arrays is a good deal mechanized there is unfortunately a good deal of hand work left on them where at least one company is now setting up to make them in Hong Kong. UNIVAC has developed a new form of memory which has so far only gone into special government programs, mostly space programs and which is based on the use of a plated magnetic wire. While several others have tried to develop this type of memory with some success in the case of one Japanese firm, Univac has carried this type of memory farther at this point than I believe has been done by anyone else. We have, for example, produced a wire memory for use in a space vehicle, a picture of such a memory is shown in Chart-----. A recent version of such a memory stores 100,000 bits in a box not much bigger than a large novel and operates on less than 1/2 a watt of power which is the amount of power consumed by a ladies pencil flashlight. We have recently developed this memory into an economical memory for use in regular computers and this memory is considerably faster and at the same time considerably more economical than any of the core memories we now produce. A machine using this memory will be announced by Univac in a few months. The potential cost and speed of this memory as well as several types of thin film memory that we are not quite as far along on are the basis of my optimistic feelings for the next 5 yrs. in this area. Chart----- shows the basic construction in this memory which replaces the Ferrite Core, a slender magnetically plated wire about the diameter of a horse hair, passes between a pair of copper strips which are used to select the digits. We are at present studying memories in which several thousand copper strips and several thousand wires cross each other in a single memory plane. Not only is this construction more

simple than the threaded core structure of a conventional memory but the number of bits in a memory plane is expected to be as many as 100 times greater than as proven practical in Ferrite Core planes and may indeed be 1,000 times ~~better~~ greater than the usual core planes. ~~Fig~~ Chart-------- shows a small ~~completed~~ memory plane of this type from one of the ~~specific~~ space memories. The next chart shows a machine which manufactures this ~~file~~ wire, tests it and cuts out the bad pieces ~~jpw tje~~ ~~particular~~ pieces of ~~file~~ wire saving only the good wire as a continuous automatic process. It has taken more than 10 years of research work on thin films and electro plating and testing methods as well as other aspects of memory design to achieve this new ~~any~~ form of memory. While it would be presumptious to conclude that this type of memory ~~of~~ by some ~~type~~ form of film memory ~~would~~ will replace most of the Ferrite memory, nevertheless my intuitions ~~nevertheless~~ tell me that this is what is going to happen in the coming years.

The improvements that have come about in logic circuits in the last few years and especially those that are ~~really~~ just getting going ~~just~~ now can be attributed to integrated silicone circuitry more than to anything else. Unfortunately, this is an area in which the skill of the mathmatician and the logical designer has brought us very little improvement in the last 15 years ~~under~~ over our best ~~cases~~ guess as to how we should do some of these things at that time. The transister, of course, made possible most of the improvement factor in the last 15 years and the integrated curcuit

"COMRADE COMPUTER"

2/1/66 Copy to Carl Abraham
Philadelphia Bulletin

NEWMYER ASSOCIATES, INC., WIRE BUILDING, 1000 VERMONT AVENUE, N.W., WASHINGTON 5, D.C.

To Gordon Smith Date September 11, 1962

cc: Mr. Lee Johnson

Re: Eckert Speech in Record

Senator Case of New Jersey has inserted in the Congressional Record a condensation of Dr. Eckert's speech on Russian computers. Copies are attached.

Newmyer Associates

Attachment

July 2, 1962.

Congressman DANIEL J. FLOOD,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN DANIEL J. FLOOD: We support the resolution (H. Res. 211) which would establish a permanent Committee on Captive Nations in the House of Representatives and I am writing this to Representative WALTER JUDD and to the chairman, HOWARD W. SMITH.

I have read the book "I Was A Slave in Soviet Russia," by John Noble. Surely Christians in America are obligated to do more than we have done to rescue the Christians being persecuted by communism.

Respectfully,
Mr. and Mrs. CLARENCE ZWACK.

Hon. DANIEL J. FLOOD,
New House Office Building,
Washington, D.C.

DEAR SIR: I support your measure, House Resolution 211. It is definitely the most effective way at the present time to combat the Soviet Russian uniperio-colonialists.

Sincerely yours,
MYROSLAV SYRYSKY.

CHICAGO, ILL., *June 12, 1962.*

JACKSON MILLS,
Freehold, N.J., July 5, 1962.

Hon. HOWARD W. SMITH,
Chairman, House Committee on Rules, New House Office Building, Washington, D.C.

DEAR SIR: As an American citizen of Cossack descent, I would like to ask you to expedite House Resolution 211 introduced by Congressman DANIEL J. FLOOD, to establish a Special Committee on Captive Nations.

I am very glad to see that the resolution included the Cossack Nation and my old homeland, Cossackia.

With best wishes for your work.

Very truly yours,
MARIA MOROZOFF.

AMERICAN STANDARD PUBLISHERS,
WILLIAM D. GRAFF, *Publisher.*

The Russian Computer Today

EXTENSION OF REMARKS
OF
HON. CLIFFORD P. CASE
OF NEW JERSEY
IN THE SENATE OF THE UNITED STATES

Tuesday, September 11, 1962

Mr. CASE. Mr. President, I ask unanimous consent to have printed in the Appendix of the RECORD excerpts from a speech delivered on August 10 by J. Presper Eckert, vice president, Univac Division, Sperry Rand Corp., New York City, at the Northwest Computing Association Conference in Seattle, Wash. Mr. Eckert makes an interesting evaluation of the role of computers in Soviet scientific activity, and has prepared a comparison of where our country stands in relation to the Soviet.

There being no objection, the excerpts from the speech were ordered to be printed in the RECORD, as follows:

COMRADE COMPUTER: THE RUSSIAN COMPUTER TODAY—SOVIET PLANS FOR FUTURE APPLICATIONS—THE OUTLOOK—AMERICA VERSUS RUSSIA

(By J. Presper Eckert, vice president, Univac Division, Sperry Rand Corp., New York City)

Russia's start in the field of electronic data processing has been slow. One reason is that the computer is an American invention. our labor force was engaged in clerical work. By 1960, this figure had increased by 11 percent to 51 percent. Last year, the computer was able to hold this increase to 11 percent. It was the first time in more than a decade that no increase was seen in the percentage of people required to keep track of what other people are doing in this country. With our continued population growth—and the fact that more people generate more paperwork—and the ever-growing complexity of government, trade unionism, and business today, just to be able to stem this tide is a major achievement. It means that more people are free to do the meaningful work of the future. This is the result of having superior computers and using them in a sophisticated way. This is the result of being Americans who as part of the free world can think freely and adapt to vital change quickly.

Things are lagging in Russia. The amount of paperwork there still is on the rise. As a matter of fact, the computer center at the Ukrainian Academy of Science in Kiev recently simulated the problem of administrative planning for the U.S.S.R. The conclusion reached was that, unless administrative procedures are changed before 1981, 100 percent of the adults in Russia will be required to perform the administrative function. Actually, between 1954 and 1961 the number of people in Russia required to handle accounting and statistical work along increased by 30 percent, according to Sr∂onov, Deputy Chief of the General Statistical Administration. This is not surprising, for less than 10 percent of Russia's clerical work is mechanized at this time even to the point of using simple desk adding machines. They are short of typewriters, drafting equipment, and copying machines. The dictaphone is almost unheard of there. There is even a shortage of office furniture. Obviously it is not enough

who joined with me in that most stimulating and very enlightening discussion which took place then on the subject of the captive nations—CONGRESSIONAL RECORD, March 8, 1961, "Russian Colonialism and the Necessity of a Special Captive Nations Committee," pages 3286–3311.

The popular response to House Resolution 211 has been so enthusiastic and impressive that I feel dutybound to disclose the thoughts and feelings of many Americans who have taken the time to write me on this subject. These citizents are cognizant of the basic reasons underlying the necessity of the proposed committee. They understand clearly the vital contribution that such a committee could make to our national security interests. In many cases they know that no public or private body is in existence today which is devoted to the task of studying continuously, systematically, and objectively, all of the captive nations, those in Eastern Europe and Asia, including the numerous captive nations in the Soviet Union itself.

Because their thoughts and sentiments are expressive and valuable, I include the following response of our citizens to House Resolution 211 in the Appendix of the RECORD:

SUNLAND, CALIF.

Hon. DANIEL J. FLOOD,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN FLOOD: I am very pleased with your resolution (H. Res. 211) and hopes the House will pass it and soon.

Thank you.

Mrs. MARY KENYON.

MINNEAPOLIS, MINN.,
July 2, 1962.

Congressman DANIEL J. FLOOD,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN DANIEL J. FLOOD: We support the resolution (H. Res. 211) which would establish a permanent Committee on Captive Nations in the House of Representatives and I am writing this to Representative WALTER JUDD and to the chairman, HOWARD W. SMITH.

I have read the book "I Was A Slave in Soviet Russia," by John Noble. Surely Christians in America are obligated to do more than we have done to rescue the Christians being persecuted by communism.

Respectfully,

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DEAR SIR: I support your measure, House Resolution 211. It is definitely the most effective way at the present time to combat the Soviet Russian uniperio-colonialists.

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Hon. HOWARD W. SMITH,
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DEAR SIR: As an American citizen of Cossack descent, I would like to ask you to expedite House Resolution 211 introduced by Congressman DANIEL J. FLOOD, to establish a Special Committee on Captive Nations.

I am very glad to see that the resolution included the Cossack Nation and my old homeland, Cossackia.

With best wishes for your work.

Very truly yours,

MARIA MOROZOFF.

AMERICAN STANDARD PUBLISHERS,
Buena Park, Calif., June 24, 1962.

Hon. DANIEL J. FLOOD,
House Office Building,
Washington, D.C.

DEAR SIR: As publisher of American Standard, I wish to congratulate you for your work concerning the establishment of a Special Committee on Captive Nations (H.R. 211).

If freedom is ultimately to triumph throughout the world, it is of vital importance that we keep our attention ever focused upon the plight of those already under the cruel heel of their Communist oppressors.

As you well know, there are those misguided persons in our Government today whose warped philosophy of social progress would have this Nation accept the status quo as imposed by the Communist global conquest. This status quo, they feel, is something we must now live with. It is tantamount to believing that we must accept cancer, heart disease, crime, and poverty.

After all, these too are facts of life, yet we spend millions of dollars in research and development in the struggle to eliminate them as far as will be humanly possible.

To accept the status quo in regard to Communist enslavement of humanity, moreover to accept every new Red gain as another unavoidable extension of this same status quo, has presented every American of conscience with a problem of the greatest magnitude.

This foolish and destructive acceptance philosophy can lead to but one final conclusion: the ultimate acceptance of Red control of the United States, and I believe that many of the people in our Government today are capable of just that type of acceptance.

With all best wishes, and prayers for majority congressional action on much-needed House Resolution 211.

Yours sincerely,

AMERICAN STANDARD PUBLISHERS,
WILLIAM D. GRAFF, *Publisher.*

The Russian Computer Today

EXTENSION OF REMARKS
OF
HON. CLIFFORD P. CASE
OF NEW JERSEY
IN THE SENATE OF THE UNITED STATES
Tuesday, September 11, 1962

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COMRADE COMPUTER: THE RUSSIAN COMPUTER TODAY—SOVIET PLANS FOR FUTURE APPLICATIONS—THE OUTLOOK—AMERICA VERSUS RUSSIA

(By J. Presper Eckert, vice president, Univac Division, Sperry Rand Corp., New York City)

Russia's start in the field of electronic data processing has been slow. One reason is that the computer is an American invention. And, although the Russians were very much interested in it from the start—they tried to order an Eniac immediately after it was announced in 1946—the United States was wise enough not to hand computer blueprints to the Russians on a silver platter. But, on the other hand, since we regard the computer as an economic tool, the United States follows an almost completely open policy on publication of computer art in this country. As a result, the U.S.S.R. has made better progress with their computers in recent years.

In my opinion, looking at the overall picture, Russia is at least 3 years behind the United States at this time in the area of electronic computers. Two years ago they were about 5 years behind. In the data-processing field their lag is greater than these figures would indicate.

At present there are between 600 and 800 electronic computers in the Soviet Union compared to 8,000 or 10,000 at work in the United States, depending on just how you define a computer. It should be noted, however, that nearly half of our computers are capable of the big, the complex jobs, while the majority of the 600 to 800 Russian systems can only deal with more restricted and generally simpler problems. Practically all of these Russian systems still rely on vacuum tubes instead of solid-state devices; their peripherals—tape and printing devices, for example—would be considered inadequate and obsolete by American standards.

And now, by a simple comparison, I can indicate to you the magnitude of the data processing problem the Russians are failing to handle.

Let's examine an area in which the electronic computer has made a significant contribution in the United States. Then let's look at a similar problem now developing in the U.S.S.R.

Even in the United States the electronic computer has only been able to stem the tide of paperwork. But it has taken more than 10 years. Back in 1950, 40 percent of our labor force was engaged in clerical work. By 1960, this figure had increased by 11 percent to 51 percent. Last year, the computer was able to hold this increase to 11 percent. It was the first time in more than a decade that no increase was seen in the percentage of people required to keep track of what other people are doing in this country. With our continued population growth—and the fact that more people generate more paperwork—and the ever-growing complexity of government, trade unionism, and business today, just to be able to stem this tide is a major achievement. It means that more people are free to do the meaningful work of the future. This is the result of having superior computers and using them in a sophisticated way. This is the result of being Americans who as part of the free world can think freely and adapt to vital change quickly.

Things are lagging in Russia. The amount of paperwork there still is on the rise. As a matter of fact, the computer center at the Ukrainian Academy of Science in Kiev recently simulated the problem of administrative planning for the U.S.S.R. The conclusion reached was that, unless administrative procedures are changed before 1981, 100 percent of the adults in Russia will be required to perform the administrative function. Actually, between 1954 and 1961 the number of people in Russia required to handle accounting and statistical work along increased by 30 percent, according to Sregonov, Deputy Chief of the General Statistical Administration. This is not surprising, for less than 10 percent of Russia's clerical work is mechanized at this time even to the point of using simple desk adding machines. They are short of typewriters, drafting equipment, and copying machines. The dictaphone is almost unheard of there. There is even a shortage of office furniture. Obviously it is not enough

say that the Russians will have to get better electronic data processing systems and improve their ability to use them.

Russia does have factors on its side in attempting to gain the most for its economy with this new tool of science.

Science, and particularly computing science in the Soviet Union, is the prestige field. The scientist in Russia has the prestige of the movie star here. Their pay is at the top of the scale. Their living accommodations are the finest The top box office attraction in Russia is the academician. Keltish, for example, current president of the Academy of Science, the most coveted scientific position in all the U.S.S.R., is a hero to the people. His work is closely allied with the computer field.

I cannot help but think, when I learn these things, what it was like in my early years. Interested in science, it was not always easy for me as a child; for my contemporaries scorned those who were interested in such a dry and dull subject. In high school I was called the "Prof." Needless to say, this nickname was not particularly meant to flatter me.

The people of the past generation hardly realized there were such things as scientific professions, and my parents were not exceptions. They urged me to study business administration at the University of Pennsylvania.

Unfortunately, even with the publicity given scientific achievements today, the situation has not greatly improved. Last year there was another decrease in the enrollment of American students for engineering courses.

I think that having an extremely favorable attitude toward science and scientists is a decided plus for the Russians.

In the United States we have tried to develop the technology as rapidly as possible to meet our needs and then apply our ideas as widely as possible. Wonderfully, the electronic computer is much more suited to the needs of the United States at this time than it is to the needs of the U.S.S.R. We have economic problems which are manageable with available techniques. Their problems are not manageable by any known techniques. By continued wise use of our computers we should make advances by analyzing where we are going and selecting the best alternatives open to us. When we have reached the point in analysis and planning where we can handle many of our objectives with a reasonable degree of certainty, happily our governmental system is one with enough flexibility to allow us to take advantage of such progress.

I believe the following eight points are worth remembering when we consider Russia's standing in this field:

Russia's start in electronic data processing was slow and they are at least 3 years behind us in the area of electronic computers.

There are 10 times as many electronic computers at work in the United States as there are in the U.S.S.R.

Russian electronic computing equipment is inadequate and obsolete by American standards.

Russia's successes in space, while spectacular, have not required many computers or really fast computers. On the other hand, Russia's economic planning does require fast computers and fast computers are unavailable there.

The Russian Communist, actually an extreme conservative, resists the very changes which he must make if he wants to improve his data processing performance. His actions must rest on the unshakeable basis of Marxist-Leninist economic theory. Because of this and other encumberances, until a few years ago even mathematical logic was out.

The fact that science is the prestige field in Russia is the one advantage they have over the United States in the computer area.

The Russians still find it difficult to bring about transition from handmade computers to units suitable for mass production.

The electronic computer is much more suited to helping solve America's economic problems than the problems of the Soviet's centrally controlled economy.

The marvelous virtue of the capitalistic system is that, after living with it, one recognizes that it is not necessary to control everything in the world in order to survive. The communistic system, epitomized in their ambitions for a planned economy, displays their feeling that they must control everything in order to survive. When and if the Communists see the folly of trying to plan a total economy, can we help them to the realization that it is not necessary to control the world to survive?

The Hanford Project

EXTENSION OF REMARKS
OF
HON. CLEVELAND M. BAILEY
OF WEST VIRGINIA
IN THE HOUSE OF REPRESENTATIVES

Tuesday, September 11, 1962

Mr. BAILEY. Mr. Speaker, under leave to extend my remarks in the RECORD, I include the following:

ANSWERS TO SPECIFIC QUESTIONS ON THE HANFORD PROJECT RAISED BY REPRESENTATIVE HOWARD SMITH, DEMOCRAT, OF VIRGINIA, DURING DEBATE BEFORE THE HOUSE OF REPRESENTATIVES ON AUGUST 29, 1962

Question. Does the Government assume any obligation?

Answer. Yes. Despite claims by proponents of the contract between the Bonneville Power Administration and the Washington Public Power Supply System that the Government assumes no obligation, any reasonable examination of the proposed contract clearly reveals that the Government, through the Bonneville Power Administration, takes upon itself serious and lasting obligations. For example, Bonneville Power Administration assumes the obligation to supply participants in this project an amount of firm kilowatts of power at prevailing Bonneville rates equal to the amount of the annual financial contribution of such participants to cover amortization and interest charges on the outstanding bonds, full operation and maintenance charges, replacements and repairs on all parts, and such other expenses as become necessary as a result of this arrangement. Bonneville's obligation to supply firm kilowatts of power is not contingent upon the supply of power forthcoming from the Hanford generating plant, but rather upon the annual financial contribution of the participants. This would be true even if at any time and for any reason absolutely no power was produced at the Hanford generating plant for any extended period of time.

Furthermore, various clauses in the contract clearly indicate that Bonneville Power Administration would be the real party at interest and basically would suffer any losses that might accrue. The contract gives Bonneville Power Administration the right to disapprove the rate of interest on Washington Public Power Supply System's revenue bonds issued to finance the project. In addition, all plans and specifications for the generating plant must be approved by Bonneville Power Administration. Likewise, the annual operating budget would be subject to Bonneville Power Administration's approval. The level of maintenance at the project would be under its control, the scheduling of shut downs for repairs and maintenance operations would have to be approved by Bonneville Power Administration. Power from the project could be dispatched only pursuant to Bonneville Power Administration's instructions.

On the basis of these facts, it is fallacious to argue that the Federal Government, through the Bonneville Power Administration, does not assume any obligations for this proposal.

Question. Who pays for the plant? Who pays for the thing that has to be constructed?

Answer. Again, it must be said that any reasonable individual upon careful examination and evaluation of all the facts must conclude that the Federal Government will in the last analysis pay for this project. Bonneville will pay for the project with a guaranteed supply of firm kilowatts of power which have a ready market at a fixed price rather than actual dollars, but it pays for the project nevertheless. As it was brought out in the hearings before the Joint Committee on Atomic Energy, July 11, 1962 (p. 82), that all the cost of whtasoever nature that the participants incur is paid by the receipt of electricity which is converted into cash by the sale of the electricity. The participants assume no risk with respect to their operation and maintenance or debt service and are sure of being able to pay all the costs because they are going to receive electricity from the Bonneville Power Administration that they can sell to make the payments. During that same hearing, Mr. Charles Luce, Bonneville Power Administrator (p. 91), said the exchange contract assures Washington Public Power Supply System participants of a market for the Hanford power so they can float these bonds. Thus, this contract is a form of security for underwriting the bonds. Mr. Luce also said Bonneville Power Administration was taking a rather large part of the risk in this project.

At another point during the hearings (p. 87), Mr. Luce testified that if a nuclear incident should occur at the Hanford reactor and the insurance did not cover it, "then the Bonneville Administration, under these exchange contracts, would have to deliver, continue to deliver, that amount of power that would be necessary to amortize the bonds as they became due."

Therefore, the net result is that Bonneville Power Administration provides the cash required for the repayment of the revenue bonds issued by Washington Public Power Supply System and all operation and maintenance charges, improvements, replacements, repairs, or any other charges whatsoever. It does this by selling its own power and permitting the purchasers to discharge their obligations for paying off the bonds. Since Bonneville Power Administration's obligation to deliver power to participants is not related to the actual production of power at Hanford, the Federal Government, through the agency of the Bonneville Power Administration, becomes the guarantor to the bondholders of the continued operation of the project for the entire term of the bonds.

Question. Then, does the Government agency; namely, the Bonneville Power Administration, pay for the plant?

Answer. When this question was asked on the floor of the House of Representatives, the answer was given, "No. They do not have to pay 1 penny. The State public power bodies pay for the plant." From the foregoing discussion of the previous question, obviously the answer given is not true. The so-called State public power bodies may be considered merely as the messengers to take the dollars they receive from the sale of the guaranteed supply of power and pay them over to the holders of the bonds. There should be no question, however, but that

SEIDMAN & SEIDMAN
Certified Public Accountants

NEW YORK, N.Y. CHICAGO, ILL. LOS ANGELES, CALIF.
WASHINGTON, D.C. GRAND RAPIDS, MICH. MEMPHIS, TENN.
DETROIT, MICH. EVANSVILLE, IND. JAMESTOWN, N.Y.
ROCKFORD, ILL. HIGH POINT, N.C. GARDNER, MASS.
BRADFORD, PA. JASPER, IND. WARREN, PA.
HOUSTON, TEX. BATON ROUGE, LA. SAN FRANCISCO, CALIF.

80 BROAD STREET
NEW YORK 4, N. Y.

February 18, 1963

Mr. J. Presper Eckert
Remington Rand
Division of Sperry Rand Corporation
315 Park Avenue South
New York 10, N. Y.

Dear Pres:

Thanks very much for sending me "Comrade Computer". Also, in follow-through of our telephone conversation, I phoned the individual you mentioned and I think he will be helpful, too.

Our group is scheduled to depart for the Soviet Union the end of April. If before then you come upon other material that you feel will interest us, or if you and I can work out a personal get-together, you can count on an enthusiastic reception.

Sincerely,

J. S. Seidman

Caught you on T.V. It was excellent.

January 31, 1963.

Mr. Jack Seidman
80 Broad Street
New York City 4

Dear Jack:

Enclosed is a copy of my talk entitled "COMRADE COMPUTER" that I promised to send you.

Sincerely yours,

J. PRESPER ECKERT
Vice President

M

Enclosure

File:

September 10, 1962. (L-16855)

Mr. Paul Armer
The Rand Corporation
1700 Main Street
Santa Monica, California

Dear Paul:

Attached is a copy of a talk that I gave recently in Seattle on some of my thoughts about Russian Computers.

I have not made a trip to Russia recently and do not know what gave rise to this rumor. On two occasions I had planned to make a trip to Russia but have not been able to work it in yet.

It was nice to hear from you and I hope to see you soon.

Sincerely yours,

JPE:M

Att. 1

The RAND Corporation

1700 MAIN STREET
SANTA MONICA, CALIFORNIA

PAUL ARMER
HEAD, COMPUTER SCIENCES DEPARTMENT

23 August 1962
L-16855

Dr. J. Presper Eckert
Sperry Rand Corporation
P. O. Box 500
Blue Bell, Pennsylvania

Dear Pres:

I understand that you have recently made a trip to the Soviet Union and had a look at some of their computer activities. Willis Ware and I have maintained a high degree of interest in their computer work since our visit there in 1959 and would welcome any information that would bring us more up to date. If you have a trip report available, we would certainly appreciate it if you could send us a copy. If it is of such a nature that you are desirous of limiting its circulation, as many such reports are, we will limit it to the two of us. In such an event, mark the envelope "Personal" when you mail it. In case you don't have them and would be interested, I am sending along a copy of our trip report and also one by E. A. Feigenbaum.

The next J.C.C. being in Philadelphia, maybe we can get together then and compare notes.

Best personal regards,

Paul

PA:al

Enclosures - 2
RM-2541
RM-2799-PR

The RAND Corporation

1700 MAIN STREET
SANTA MONICA, CALIFORNIA

23 August 1962
L-16855

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Enclosures - 2
RM-2541
RM-2799-PR

Extract of an article issued in the German magazine Der Spiegel, dated November 13, 1963.

ELECTRONIC BRAINS DEFEAT DOGMA

THE COMMUNIST REFORMATION

by Georg Paloczi-Horvath

The exile, Hungarian and Biographer of Khrushchev, Georg Paloczi-Horvath thinks to have discovered a law of development of the Soviet society which has been hidden until now. In his recently published book called, "Rebellion of Facts", he states that the ideology and ways of thinking formed by Stalin have been liberalized and Westernized with the start of the Second Industrial Revolution. The decisive force in this development, which he calls Communist Reformation, is the progress in cybernetics, the science of automatic control of people and machines.

One of the most important developments in the second half of the Twentieth Century is that, in the Western Communist World, Marxism and Leninism has to give way to a new science, namely cybernetics, as a generally accepted control method of managing, planning and industrial production.

This is a revolution which up to now has been more or less unnoticed since it was not characterized by dramatic events or manifests.

Future historians will, perhaps be in a position to identify some of the resolutions of various Soviet leaders who themselves actually contributed to this reformation, without realizing the consequences, through the establishment of a Ministry for Automation, through the launching of a deStalinization campaign and through the recognition of the supremacy of sciences over politics. This last and most meaningful step relates to cybernetics.

All Communist leaders of the past considered a Marxist dogma as a generally applicable scientific law. They treated their countries as enormous laboratories. However, instead of testing their theories and changing those that proved to be false, or throwing them out if not usable, they experimented to find methods which would lead, in the shortest time possible, to anticipated results expected by Marxists and Leninists.

When we consider the Leninist party and government apparatus as a machinery of power it can be said that its greatest weakness is the lack of provisions for self-regulation and self-correction.

Once the party line is adopted, criticism is no longer possible. When actual results of a policy differ from what has been anticipated, this is regarded as a mistake of the executing officer and not of the regulation or policy. With time, therefore, most of the functionaries ignored the real results and reported instead expected results. Since 1934 no one could oppose Stalin without facing the risk of being fired, put in jail or executed. From this situation it can be concluded that Stalin did not have at his disposal objective means of measuring real situations and developments and was not in a position to familiarize himself with the complex problems of his vast country.

Now this intellectual isolation begins to belong to the past. Soviet leaders have officially assigned priority to cybernetics over all other sciences. As a result, actual events and results are being reported. This, in a certain respect, is of course a "democratic" principle.

Khrushchev and his comrades did not realize what the consequences of their decision would be when they established fully mechanized manufacturing plants, vast industrial complexes and electronic brains in Soviet planning agencies.

The people exercised a silent pressure and party functionaries didn't even recognize that the border of unpermissable had been crossed step by step.

In Genetics, Physics, Anthropology and Chemistry, the scientists everywhere requested the right to make mistakes, the right of experimenting in all directions.

Thousands of scientists received permission, for the first time in their lives, to have access to foreign scientific publications. Leading scientists fought against the ban, which existed in the past, in disciplines like Logistics, Quantum Theory, Theory of Relativity, Mathematical Statistics and others. Since 1955, we witnessed, almost every month, the rehabilitation of certain segments of science. Dogmatic party functionaries fought a desperate battle against the popularization and generalization of cybernetics and its basic principles. They realized, and correctly so, that the entire method of cybernetics is in direct contradiction to the theory and practice of unlimited dictatorship, consequently to the present principle and method of party control.

This was the period of clashes, between Khrushchev and Malenkov, between the "Verbokrats" and "Technocrats", within the party leadership, which ended with the defeat of Malenkov.

Malenkov, Bulganin, Perwuchin, Saburow and many other leaders were educated engineers. Some other had certificates in Economy and Natural Sciences. They were opposed by "Verbokrats" led by Khrushchev whose main activity was agitation and issuing of orders. Khrushchev always understood the science of Verbokratie well.

In 1956 the cybernetics had a good start. The Soviet government announced the establishment of a Ministry for Automation. Cybernetics appeared to have to play a significant role in the race to catch up with the Capitalist world.

In 1956 the Nobel prize was given, for the first time, to a Soviet scientist and member of the Academy of Sciences, Semjonow, for a work in Chemistry. There were other Soviet scientists who likewise had a high International regard like Pjotr Kapiza, Igor Kurschatow, Lew Landau, Jakow Frenkel, Igor Tamm and P. K. Anochin.

In addition to H - bombs, Intercontinental missiles and satellites, the Soviet scientists established a grandiose production for atomic energy. To support the atomic research, the U.S.S.R. built the largest atom smasher in the world. This new center served science exclusively. The number of electronic data processors also grew.

However, many party functionaries still opposed the rehabilitation of these machines.

Writers, intellectuals and students were repeatedly reminded that the Communist Party is the only leader of thinking and will remain so.

There were many other proofs that Khrushchev and his co-workers slipped back to the strictly dogmatic and despotic extremes of Communism. However, in some areas of science, industry and economy, this could not happen without seriously affecting the economic progress and the military power of the State.

In fact, the prerequisites were given for an attempt of the science of cybernetics to take a leading role.

In 1958 the entire scientific elite of Russia went over to a general attack. Khrushchev and his Presidium were convinced by scientists that after rehabilitation of so many branches of science and theories there is a need to also clarify the relationship between Marxism and the Natural Sciences at a conference.

In October, 1958 a conference was held concerning philosophical problems of natural sciences. Men with great names in Soviet sciences proved step by step that Marxists are scientific laymen who represented views which have long become obsolete. The Marxists had to retract in many areas.

It appears that the party presidium accepted a resolution, as a result of this conference, giving immunity to automation and cybernetics against dogmatic functionaries. In fact, this soon became part of the new Communist program.

The Soviet press, magazines, utopian-technical literature became propoganda organs for cybernetics.

The Professor of the Academy of Sciences, Kolmogorow, represented the point of view that cybernetics could become a universal super-science. The two most important ideologists, Suslow and Iljitschow, declared in 1960 and 1961 repeatedly that the application of cyberneitcs is in line with Marxism-Leninism.

The official triumph of cybernetics took place in October 1961 on the 22 Party Contress. The newly adopted party program announced that cybernetics, data processors and control systems must be applied in broad terms in industry, in research, in planning, in accounting, in statistics, and in management.

This led to a decisive conflict. Politicians had no longer the total power of directing science, planning, economy and industry. There is no longer place here for revolutionary agitation and party ambitions.

Politics however, do maintain their power in agriculture, literature and art, since these segments do belong to the ideological sphere.

In this respect, the new party program is not different from old Stalinist dogmas. Literature and art must remain on the platform of "socialistic realism" and accept the leadership of the party.

Conflicts can not be avoided when a large portion of the population engaged in vital areas of industry and science free from dogmatic requirements in their leisure time are provided with party directed dogmatic philosophy, literature and art.

This conflict and the schizophrene behavior which is behind it, is one of the great powers in future developments of the Communist Reformation.

January 10, 1964

T. Keler

Lausanne

J. P. Eckert

New York, May 6, 1965.

Executive

COMPUTERS IN RUSSIA

To: Dr. Presa Eckert
New York

From (Name): T. Keler

Location & Date: Lausanne, April 30, 1965

Department: CONTROLLER

Subject:

Carbons:

In response to the request in your letter of May 30 I am pleased to attach a copy of the article "Electronic Brains Defeat Dogma" from the German magazine Der Spiegel.

Also, please accept my thanks for the clipping from the New York Times which I found quite interesting.

Some time ago, I think in early 1964, I made a translation of an article published in the German magazine "Der Spiegel". The title of it was "Computers defeat dogma" or something like that. The article was written by Dr. Paloczy Horvath. Since I lost my copy of this article I would very much appreciate it if you could send me another copy if you still have it.

M

Enclosure

Attached I am also sending you a copy of an article published in a recent issue of New York Times, which might be of interest to you.

J. Presper Eckert

With best regards,

T. Keler

Enclosure

UNIVAC

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CABLE ADDRESS : SPERAND

To : Dr. Press Eckert
New York

From (Name) : T. Keler

Location & Date : Lausanne, April 30, 1965

Department : CONTROLLER

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Attached I am also sending you a copy of an article published in a recent issue of New York Times, which might be of interest to you.

With best regards,

T. Keler

Enclosure

...were no outsider, ...de Gaulle, has much influence on events."

The new Soviet Ambassador to Paris, Valerian Zorin, emerged from a forty-minute talk with Premier Georges Pompidou today exuding optimism.

Seeing the situation as "fa-

Continued on Page ., Column 5

...n Dead at 60; ...at U.N. and Paris

Keystone

Sir Pierson Dixon

two years at the British Schoo... or Archaeology in Athens befor... entering the Foreign Service i... 1929.

His first jobs were the routine ones of the young diplomat: i... Madrid, Ankara, Rome. The war gave him his first great opportunity.

Early in 1943 the American and British governments found themselves deep in a squalid French political dispute in Algiers. Winston Churchill sen...

Continued on Page 8, Column 2

A.M., destroying five trucks and leaving another in flames along Highway 15, 135 miles south of Hanoi.

Other Convoys Bombed

Other Navy aircraft, including a Skyhawk light jet bomber and Skyraiders, hit until dawn at other trucks along Highway 15 and Highway One. No definite results were reported.

The Vietnamese Skyraider was lost during a raid on the Myduc highway bridge, a three-span, 190-foot-long structure on Route One, 18 miles south of Donghoi.

The bridge, previously hit but not destroyed, collapsed. Several military buildings in the area were also reported to have been heavily damaged.

While American pilots have

Continued on Page 2, Column 2

The Secretary of Defense conferred with President Johnson immediately after returning from military strategy talks in Honolulu earlier this week.

He said after that meeting that United States military aid to South Vietnam would be increased from $207 million this year to $330 million.

Informed sources in Washington said the South Vietnamese Navy was expected to get new and fast United States patrol boats to deal with armed sea infiltration by North Vietnam.

The final decision on any assistance to improve South Vietnam's Navy operations would depend on the result of a study now being made.

Mr. McNamara, after the Honolulu strategy conference, said it was planned to step up "interdiction of infiltration by sea."

Soviet Rebuff to Marxists Seen In Award to Reform Economists

By THEODORE SHABAD

Special to The New York Times.

MOSCOW, April 22 — The Soviet Union's orthodox Marxist economists have suffered a severe setback as a result of the award of the Lenin Prize to a group of reformers they had opposed.

The award, among 40 Lenin prizes announced early today, suggests that the new Soviet leaders are now committed to a radical change in economic practice based on supply and demand and other innovations that had been considered incompatible with the Marxist theory.

The controversial award was given to three economists, Leonid V. Kantorovich, Viktor V. Novozhilov and the late Vasily S. Nemchinov, for their work in developing mathematical techniques in economics.

In the last decade the three men have been they figures in a drive for adoption of economic methods that were outlawed under Stalin but have been widely used in the West.

Professor Kantorovich is the inventor of linear programming, a mathematical technique that can be used to solve such complex economic problems as how to set up most efficient airline or railroad schedules or how to operate oil refineries most profitably.

During public discussion that preceded the Lenin Prize awards, orthodox economists spoke out strongly against these three nominees.

The opposition was not so much against the mathematical technique itself as against abstract concepts favored by the group.

Opponents headed by acade-

Continued on Page 2, Column 3

Guerrillas Ambush Marines

SAIGON, April 22 (UPI)—Communist guerrillas ambushed a patrol of 50 United States Marines near the Danang airbase today. One Marine was wounded in a bitter 10-minute battle—the first clash between Marines and the Vietcong.

The Marine patrol, a platoon-sized unit, was attacked by the Vietcong about noon, four miles beyond the defense perimeter ringing the big American air base.

Downed Pilot Identified

WASHINGTON, April 22 (UPI)—The United States Navy identified today Lieut. Philip Butler, 25 years old, as a pilot whose plane was shot down Tuesday night in a raid on North Vietnam. Lieutenant Butler was listed as officially missing.

Twelve United States servicemen were killed in Vietnam during the week ended Monday, bringing the four-year death toll to 474, the Defense Department said.

SOVIET MARXISTS RECEIVE SETBACK

Continued From Page 1

...nician Konstantin Ostrovityanov accused Professor Kantorovich of ignoring Marx's labor theory of value and to favor the ideas of Western economic theorists, such as the usefulness of marginal analysis.

According to Marxist doctrine, the ultimate value of any good is determined by the amount of socially necessary labor time incorporated in it. The Western view is that value depends on the relative scarcity of goods as reflected in the supply-demand relationship, which determines price in a freely competitive market.

Still Applicable

Marginal analysis is particularly applicable to an economy like the Soviet Union's, which still operates with limited resources and is essentially an economy of scarcities.

In recent discussion Mr. Ostrovityanov said Professor Kantorovich's ideas had no application in the Soviet Union because the country was "advancing toward abundance of products" promised under Communism.

Orthodox economists are generally believed to be still opposed to the ideas of Prof. Yevsei G. Liberman, an economist who has proposed that Soviet managers be given greater freedom to plan production on a basis of consumer demand. In the textile, leather, garment and shoe industries 400 factories are scheduled to go over to that system this year.

...ough, for 20 years Prime Minister of Northern Ireland, and Lord Bridges, former head of the British Civil Service.

The new Knights replace two ... "I would there... take this opportunity to urge upon you to get this monstrous fabrication out of your mind."

Western Europe

Weather Record

Observations taken at 3 P.M., G.M.T.

	F	C	
Athens	67	19	Cloudy
Beirut	68	20	Clear
Cairo	92	33	Clear
Istanbul	59	15	Overcast
Moscow	60	16	Partly cloudy
Oslo	59	15	Partly cloudy
Stockholm	53	12	Very cloudy
Tel Aviv	85	29	Clear
Vienna	44	7	Rain

Observations taken at noon, G.M.T.

Amsterdam	58	14	Partly cloudy
Barcelona	61	16	Clear
Berlin	54	12	Rain
Biarritz	54	12	Partly cloudy
Brussels	48	9	Very cloudy
Copenhagen	52	11	Very cloudy
Casablanca	66	19	Very cloudy
Dublin	50	10	Rain
Geneva	59	15	Cloudy
Lisbon	61	16	Very cloudy
London	54	12	Cloudy
Madrid	58	14	Partly cloudy
Munich	41	5	Rain
Nice	59	15	Very cloudy
Paris	56	13	Overcast
Rome	55	13	Partly cloudy
Venice	50	10	Overcast

Observations Taken at 3 P.M., E.S.T.

New York	72	22	Sunny

August 17, 1962

Mr. F. Grodon Smith,
Vice President
Remington Rand Division
Sperry Rand Division
315 Park Avenue, South
New York 10, New York

Dear Gordon:

Enclosed are five copies of the edited version of "Comrade Computer." Fred Palmer, Bill Lydgate and I think you should have this speech circulated.

Best,

Norman L. Wolfson

NLW:dg
Encls.

cc: Mr. Fred Hoar w/ 3 copies
Mr. J. P. Eckert

Title: Speeches

M

EARL NEWSOM & COMPANY

August 17, 1962

EARL NEWSOM
FRED L. PALMER
A. B. TOURTELLOT
W. A. LYDGATE
J. R. NEWSOM

Mr. J. Presper Eckert
528 Conshohocken State Road
Gladwyne, Pennsylvania

Dear Pres:

Enclosed is a copy of the edited version of "Comrade Computer" and a carbon of a letter I wrote Gordon about it.

Best,

Norman L. Wolfson

Norman L. Wolfson

NLW:dg
Encl.

595 MADISON AVENUE, NEW YORK 22, N.Y.