

THE MACHINE TOOL INDUSTRY

8 March 1950

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Mr. David Ayr, a native of Scotland, received his early training in the machine tool business at Brown & Sharpe Manufacturing Company, Providence, Rhode Island. Leaving Brown & Sharpe after an extensive training he became associated with the Pierce-Arrow Motor Car Company of Buffalo, New York. During the first World War he was identified with the Russell Motor Car Company of Toronto in the capacity of Works Manager of their Buffalo plants. At the conclusion of the war he took up residence in Toronto and was Vice President and General Manager of the Russell Gear & Machine Company, Toronto. In 1924, Mr. Ayr became associated with the Pratt & Whitney Division of Niles-Bement-Pond Company as Works Manager. In 1932, Mr. Ayr was elected President and General Manager of the Hendey Machine Company in Torrington, Connecticut, which position he now holds. He is a Director of the Waterbury Farrel Foundry & Machine Company of Waterbury, Connecticut; the Torrington National Bank & Trust Company, Torrington; the Manufacturers Association of Connecticut, and of the Hendey Machine Company; he is also a New England Governor of Liberty Mutual Insurance Company at Boston. Mr. Ayr is the current President of the National Machine Tool Builders' Association.

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## THE MACHINE TOOL INDUSTRY

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COLONEL MEETZE: Gentlemen, the subject of our lecture this morning is, "The Machine Tool Industry." A number of us feel that the machine tool industry is the backbone of mass production. We also feel that American manufacturing superiority is due to the ability of this same machine tool industry to make machines that will accurately duplicate parts, whether the parts are to be reproduced in small numbers or in millions.

Our speaker this morning, Mr. David Ayr, is well known to some of you, for during your course on Manpower he was with us and discussed this one facet of the machine tool industry.

Mr. Ayr is a native of Scotland and for many years has been prominently identified with the machine tool business. At the present time he is president and general manager of the Hendey Machine Company. In addition, he is also president of the National Machine Tool Builders' Association.

Mr. Ayr, it is a pleasure to welcome you back to the College.

MR. AYR: Colonel Meetze and gentlemen of the Industrial College of the Armed Forces: The first step to be taken in a war program is for the armed services to decide what they are going to need in the way of ships, guns, and planes, and for them to select the contractors to whom they will turn for the production of these weapons.

The next step is to get the manufacturing equipment that these contractors must have to supplement what they already have in their plants.

Since government arsenals and yards must, to a very large extent, be shop laboratories for developing new weapons, and since they are not usually tooled up to produce in the enormous quantities required by war, we must look to private industry for production of munitions; therefore, the machine tools must be bought by private industry. Since these companies are already metalworking companies and have used machine tools, they are well trained to undertake this task.

At this point we run into our first great difficulty; that is, there is not enough of the machine tool industry. This is a relatively small industry. Its total number of wage earners today is less than the number you will find in many single plants of large American corporations. At the moment we employ about 37,000 wage earners. Since the end of World War II, 36 companies have either been purchased by larger companies or have gone out of business. Of these 36 plants, 20 are either

closed entirely or are being used for the manufacture of something other than machine tools. Since there are only about 200 or 225 plants of any importance in the machine tool industry, you will recognize the fact that this has been an exceedingly serious shrinkage.

In 1939 the industry was about the same size as it is today; but it began to meet the war demand long before we actually entered the war. We were asked early in 1940 to increase the production of machine tools for American airplane engine manufacturers so that they, in turn, could increase their output of engines for the English and the French, who were trying to build up their air forces. In 1942, the monthly average employment in the machine tool industry was 112,000 wage earners. The production in 1939 was 200 million dollars. By 1942 the industry had reached a peak of 1.32 billion dollars followed by a production in 1943 of 1.2 billion dollars. You will note that this is an increase of six-to-one.

I have given you this brief summary of the situation in our industry because it has an important bearing on what we must do in time of peace in order not to find ourselves severely embarrassed for lack of machine tools if war should break out. We cannot depend on the industry to expand sixfold in three years because the industry is today a smaller industry than it was in 1939; nor have we any assurance that we will have three years' warning the next time.

What reserve have we to meet the immediate enormous demand for machine tools? We have the following:

1. Machines now installed in industrial plants. These are of the utmost importance because they are in running order, under supervision, and even though they must be retolled can be most speedily put to work.

2. The National Security Reserve of idle war plants and the machine tools now in them.

3. The JANMAT Reserve of about 100,000 machine tools.

4. Used machines in the hands of dealers (about 60,000 units).

5. The increasing output of new machines from the machine tool industry.

Now, let us review these resources one by one.

One of the first and most obvious things that comes to mind is that all the United States metalworking industries that form the very basis of our defense must modernize their equipment in time of peace and must not allow it to become obsolete. Yet the mid-century survey of

metalworking equipment in the United States, conducted by the McGraw-Hill Publishing Company--which, by the way, I draw most earnestly to your attention--indicates that American metalworking industries today are replacing about 2 percent of their machine tools every year, which means a complete turnover in 50 years. Oddly enough, the worst showing is made by the automotive industry, which is buying machine tools at the rate of about 1 percent per year. When we bear in mind that most of the money spent by metalworking companies has, since the war, been devoted to plant expansion and to tooling up for consumer products which they could not produce in time of war, it can be readily understood that they have neglected the task of replacing their old machines with much more productive machines that are now available.

Since it is to the selfish interest of any company to keep its plant modern in order that it may most effectively meet competition, you will naturally wonder why these corporations have been so remiss.

The answer is the depreciation policy of the United States Treasury which insists that the taxpayer must not recover the capital invested in a machine tool in less than 15 to 25 years, the average being about 21 years. That means American industry has in its shops today machines that are 20 years old, or older, on which they have not yet recovered the capital originally invested in these machines.

Now, these are machines built in 1929 or before. They were rendered obsolete by the new designs the machine tool industry produced after the depression of 1932. They were rendered doubly obsolete by the new machines designed by the machine tool industry after World War II. Yet, they have not been paid for.

The gravity of the situation will perhaps be illustrated by the fact that American metalworking industries have today 379,000 machine tools that are over 20 years old. That is equivalent, gentlemen, to all the machine tools there are in the New England States. That is equivalent to all the machine tools there are in the vast automotive industry, the agricultural implement industry, plus the industrial electrical industry.

Even when the money originally invested in a machine tool years ago has been recovered, it is not sufficient to buy the modern machine tool that should replace it because of the inflation of our currency, a natural result of our spending (as a nation) more than we produce. That means the company must set aside from its profits after taxes an additional amount to supplement what it recovers in the form of depreciation reserves in order merely to replace the machines in its plant.

But when the corporation elects to plow back part of its earnings into its plant, it runs into Section 102 of the Treasury Regulation.

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That imposes an additional tax of 38 percent on a corporation whose earnings are over \$100,000 a year if an inadequate portion of its earnings are paid out in dividends. What is "an inadequate portion of its earnings?" Nobody knows. That is a matter of treasury judgment.

That section means, in plain English, that four or five years after the close of its taxable year the treasury says to the corporation, "You did not distribute enough of your earnings to your stockholders five years ago. We now impose this additional tax upon you." If the Treasury makes such a finding, the stockholders in that corporation may bring suit against the directors for dividends they should have had. In the face of that threat, American corporations are now distributing to stockholders the money they should devote to keeping their plants up to date.

American industry should be one vast arsenal, properly equipped for efficient production, and immediately available in the event of war.

The second great defense against the immediate peak demand that will come in case of a sudden war is the reserve of idle machine tools that we have in frozen war plants in the National Industrial Reserve and machine tools being held in the National Industrial Equipment Reserve. Yet, in spite of the President's directive, some 10,000 machines have been taken out of the latter reserve since the war for the use of contractors and subcontractors under current munitions programs. In addition, a great many machines have been taken into the reserves that are not operable. They were unsalable in the hands of War Assets and the armed services took them over; they are useless. We are, therefore, holding an inadequate reserve, which is melting away in time of peace, yet which should be an important defense if war breaks out.

To be sure, these machines will be obsolete at that time; to be sure, some of them will be covered with rust. But we had 18 million dollars worth of machine tools stored in the Rock Island Arsenal after World War I, and when World War II broke out every one of those machines was taken out, cleaned, repaired, and put to work. In the first terrible weeks of the next war, with the machine tool industry doing everything it can to muster its resources and increase its output, these machines would be worth their weight in gold. But, gentlemen, remember that 100,000 machines, even if all of them were useful, are equivalent to less than four months' production of the industry at the 1942 rate.

The stocks of used machinery dealers will be most useful, since they are in the hands of men who understand machine tools and are scattered throughout the industrial part of the country. A definite plan should be worked out in detail now by the National Security Resources Board so that a complete inventory of these machines will be immediately compiled by the Tools Division of the Board when war breaks out. Not every defense operation requires a new machine.

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The last and most important resource is the machine tool industry. We have the plant capacity to produce about 600 million dollars worth of machine tools a year; the limiting factor is trained manpower.

In 1939, because the machine tool industry was called on to expand its output before most American industries became involved in the war effort, we had no difficulty in mustering the manpower we needed, although we could not then, and never can, find the all-round mechanics that are the very core of our production. If war comes suddenly, Selective Service should leave the machine tool industry alone for the first six months of the conflict. Naturally, the machine tool builder is not going to employ youngsters of draft age; but if he must at the same time endeavor to increase his employment while struggling with the paper work and the complexities of Selective Service, he will be greatly handicapped in the all-important task of increasing his output.

Comparatively speaking, we had no difficulty with Selective Service during the last war because the Regional Boards ignored the volumes of regulations being poured out by Washington and used their own judgment. In most cases they used good judgment. We eventually lost all our men of draft age, but they were taken from us gradually and we were given an opportunity to make these adjustments piecemeal without upsetting our entire production schedule.

I would be remiss if I did not add that a machine tool builder must have discipline in his shop if he is to do his job. Government policies that widen the gap between management and the worker, that gives union organizers an unlimited veto power over the production we must have in order to win the war, are dangerously near to treason.

I cannot discuss this matter fully in the time at my disposal, but let me say that we must find legal means to curb labor monopoly, or risk the very continuance of our form of government and our freedom as individuals. No Communist could dream of a more effective weapon than a union free of internal democratic restraints and not subject to any effective control by law.

One important step has been taken. The Tools Division of the National Security Resources Board has placed on file with each machine tool builder a "Tentative Production Schedule," which is to become a contract immediately upon the outbreak of war. These are helpful because they should eliminate a period of confusion and uncertainty. But bear in mind, gentlemen, that tentative orders mean very little in the hands of a company at a standstill.

These schedules should be revised at intervals to keep them in line with current industrial practice and the conditions in each plant.

Subcontracting represents an extremely important part of machine tool expansion. In fact, 15 percent of the output of machine tools during the last war was based on subcontracting in other than machine tool plants. The machine tool builder is familiar with this procedure. He used it whenever he had a peak demand in time of peace. He has learned from long experience where he can go to get the kind and quality of work he must have.

Subcontracting is neither easy nor a cure-all. In the first place, with the exception of a very few companies, no subcontractor can make a complete machine in a reasonable period of time, at a reasonable cost, or to the limits of accuracy which are essential. We find that subcontracting is most useful in securing parts for machines or even subassemblies, but not complete machines.

Furthermore, it must be remembered that when we place a subcontract it means some responsible shop executive from our own organization must spend a great deal of his time on the road instructing, guiding, and watching over the subcontractor so that until he becomes familiar with the work we do not waste time by manufacturing scrap.

Well-meant attempts by Congress to divert an arbitrary percentage of subcontracts to small American business, because we fear the growth of the large corporations that can give us the most effective cooperation in the least possible time, can be defended only if you are willing to face the fact that we will pay for any resultant delay with the lives of our fighting men. A small company that cannot find essential work to do in time of war should close its doors. A company that has to be spoon-fed under those circumstances does not have the energy to make an effective contribution to the war effort.

One of the helpful things that was done by the War Production Board was to summon a group of competitors together in one of the fields in our industry--let us say the lathe manufacturers--and arrive at an allocation of sizes so that the production of any one plant was increased by concentrating on a smaller number of sizes or types of machines.

Broadly speaking, we can hardly hope for help from the machine tool industries of other countries. Very few machine tools are made in Canada. Very few machine tools are made in England or Europe of the quality that American war contractors must have. The machine tools made in time of war must be just as accurate as the machine tools required for the arts of peace. As a matter of fact, in the last war we had to tackle jobs that were even more accurate than anything we had ever done before. The defense of the United States must rest upon our own machine tool industry.

As you would naturally expect, the first thing that happens when we swing into war production is that every contractor and subcontractor wants all his machine tools at once. Not only that, there is a tendency on the part of the individual works manager to protect himself by over-buying. If he ought to have five turret lathes operating three shifts, he will play safe by ordering eight turret lathes. It is not at all unlikely that the branch of the service for whom he is working will interpose the suggest that he buy 12. Now, obviously, these additional seven turret lathes are being taken away from some other contractor who really needs them for munitions of the highest priority.

There is also a disposition to demand immediate shipment, or shipment in a very few days. This caused us a great deal of trouble at the beginning of World War II, when the machine tool industry was held up by many people in Washington as the bottleneck of the war effort. In response to that challenge, our Association sent machine tool executives to the holders of the 50 most important prime contracts that had been placed by the various armed services. In not one single case did they find that the prime contractor was actually delayed or waiting for machine tools. In the case of one important tank arsenal we found they were crying for machine tools although there was no sewer in the plant and men could not have been put to work on the machines even if they had them. Other people who were crying for machine tools had not yet put a roof on the building where the machine tools were to be used, nor had they laid the floor on which they should be mounted.

The study was continued into the next 50 most important contracts and practically the same situation was found there.

Excessive demands on the part of the individual contractor were supposed to be under the control of a resident uniformed officer from one of the armed services, but that arrangement just did not work out. It was found that this uniformed officer was so much interested in the success of that particular contract that he shared the anxieties of the contractor and supplemented the contractor's pleas with his own, with the result that there was no attempt at the source, in the beginning of the war, to curtail these extravagances.

Thereupon, a team of manufacturing executives was organized by the War Production Board. They went around to the contractors and subcontractors that needed machine tools and checked their actual production lines against the orders they had placed and the deliveries they had specified. That brought order out of confusion, and from that time on we heard no more complaints about the machine tool industry being the bottleneck of the war effort.

In general, machine tool builders would like to see Priority Order E-1-b re-established in the event of war. It was the last of

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several attempts to write a priority regulation for the industry and was conceived by Major S. E. Reimel, of the Ordnance Department of the Army (now Brigadier General Reimel, retired), and Captain E. R. Henning, USN, retired. I will not go into details, but let me say that, broadly speaking, the idea was to divide the production of a machine tool plant 75 percent for domestic needs and 25 percent for overseas and consumer needs. If the latter category did not require more than 20 percent of the machine tool builder's output, then an additional 5 percent was devoted to the war needs and the domestic war needs.

The 75 percent for domestic needs was divided among nine claimant agencies, being those divisions of the armed services that most greatly needed machine tools. If, then, a manufacturer of internal grinders found that Air Forces contractors had on his order board about 50 percent of all the machines on order, he would that month devote 50 percent of his output to the needs of the Air Forces. On the first of every month this was revised and the production schedule rearranged. In general, every effort was made to give the contractor the machine he wanted on the date he had specified and, in case of conflict, to give preference to the contractor who had the higher priority standing. There were, of course, occasional emergencies which made it necessary for the War Production Board to modify these production plans; but, in general, it worked very well. It had the great advantage that the machine tool builder in his own plant could make necessary decisions and do the right thing without constant reference to Washington for detailed instructions.

The Controlled Materials Plan, which was the outgrowth of several preliminary efforts to control essential materials, will work very satisfactorily if we are engaged in a total war. If the war effort is not so great as to enlist the utmost resources of the Nation, then the Controlled Materials Plan must be substantially modified in order to permit civilian production to continue without interruption. We believe the Controlled Materials Plan should again be adopted, although there were occasional difficulties, such as the regulation which forbade the machine tool industry from using rubber. Admitting that rubber was at that time in very short supply and we were conserving it with the greatest of care, it must seem obvious that since practically every machine tool built has a rubber V-belt between the motor and the driven shaft, this regulation threatened to put an abrupt end to production of machine tools for the war effort. In this, as in other matters, it is essential that the authorities in Washington be closely in touch with the industry and make sure that experienced machine tool builders are consulted before regulations of drastic intent are drafted and enacted.

After we find out where these machine tools are to go, increase our production, and ship them, the machine tool builder still has the important duty of making sure that that machine tool starts up, that the operator is properly instructed in its use, and that it gets into

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production on the part required, in the quantities required, and to the tolerances that are needed. We do this through men whom we call "demonstrators." They are, in time of war, of extreme importance, as you will readily realize. Yet, throughout the war, Selective Service declined to recognize the fact that a demonstrator is an essential employee and the only way in which we could keep these important men at work was to ask for their deferment on the basis of their being "all-round mechanics."

Another instance of misinformed government emphasis was in the drive to make all machine tool builders run their plants three shifts a day, six days a week. Now, the machine tool industry occasionally has to increase its output in time of peace. It has had some experience in how this can best and most economically be done. It knows from long years of experience that using two shifts, each operating 10 hours, paying time-and-a-half for the ninth and tenth hour, is the best way to secure maximum production. We know from experience--and this is especially true in time of war--that we cannot muster the junior shop executives to supervise that third shift, we cannot get good men to work on it when jobs are plentiful, and that we actually get less production on three shifts, each working eight hours, than we do on two shifts, each working ten hours. Yet we struggled in vain against that arbitrary policy until General Knudsen came to our assistance and relieved us of the necessity of reducing our production by increasing our shifts.

One outstanding lesson from World War II should not be forgotten. As long as we are at war we will need machine tools. The demand after the first peak will vary; but every new munitions program will involve the need for more machine tools. Therefore, as long as there is a war, the machine tool builder must not be allowed to divert any part of his productive capacity to other products. In 1943 it was agreed that we had all the machine tools necessary for the war effort. Pressure was brought on machine tool builders to take subcontracts for high priority munitions parts. They had hardly gotten to work on this program when there was a surge of machine tool demand and they found themselves in the embarrassing position of having a shop full of high priority munitions work at the same time the Government was insisting on an increased output of their high priority machine tools. The demand for machine tools was so far from ended that in 1944 we were called on for 497 million dollars worth of machine tools, and in 1945 for \$423,700,000 worth.

In general, the industry had very little difficulty with price regulations; but we would suggest that the operations of the Office of Price Administration must be far more flexible. In case after case, the price that happened to be frozen on the date arbitrarily selected, which was 1 October 1941, did not cover costs or would represent a substantial loss to the machine tool builder. The procedure for application for relief was complex and relief was so long delayed that in some cases the war was over before the machine tool builder got his answer. The danger

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here is not merely that the machine tool builder will take a loss on one or two machines. The danger is that he will quietly stop producing that machine, which may be one that we greatly need in the war effort.

Since the industry's prices were frozen in 1941, since costs went up substantially throughout the war, and in view of the high tax on corporations and the excess profits tax, no machine tool builder made an excessive profit during the war. They needed the reserves they had accumulated in order to face the postwar years, when the flood of wartime machine tools would surge through their market at prices of 10 or 15 cents on the dollar; when they would need these resources to redesign their machines to stimulate the flagging postwar market. Nevertheless, the Price Adjustment Boards insisted on handling the machine tool industry just like any other industry and refused to admit that there was any possibility that the industry would not have a peak demand when the war ended. That policy has a lot to do with the appalling loss of machine tool capacity since 1945.

Gentlemen, I do not wish to be misunderstood. The machine tool industry is a highly competitive industry. We recognize competition as an extremely painful and sometimes disastrous experience, but we respect it as entirely necessary in our economy. This industry does not want a subsidy; but if we are to carry on our shoulders, as we must, the grave responsibility that faces us in sharing in the defense of the Nation, we believe the Government should remove the unnecessary interferences and handicaps in time of peace which prevent the modernization of American metalworking industries, and which cripple the machine tool industry in its struggle to survive.

We believe the National Security Resources Board should be one of the most important agencies of our Government, and that the present era of neglect should be brought to an end. We believe that all the discussion of details should take place now and not after war breaks out. We believe that every machine tool builder should know just what he is to do if that emergency arises. He should know under what priority scheme, under what Selective Service regulation, under what materials regulations, and under what employment conditions he is to go ahead. It should not be necessary for any machine tool builder to come to Washington when war breaks out.

Unless our planning goes beyond the stage of conversation and seeps down into the grass roots, this Nation may some day bitterly regret the months that have slipped by and the opportunity that is gone forever.

Thank you, gentlemen.

COLONEL MEETZE: Mr. Ayr is now ready for your questions, gentlemen.

QUESTION: Mr. Ayr, you mentioned that you had lost a large percentage of your skilled workers with up to ten years of seniority.

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Are you keeping a record of those men, where they go, in an attempt to be able to recover them in the event you should have a demand, we'll say next week, for a return of those skilled people?

MR. AYR: That is a good question, but I do not believe that I have a good answer for it. Under our company's contractual arrangements with CIO, UAW seniority of employment must be maintained. That simply means that when business goes bad, the last men placed on the pay roll must be laid off first. This is known as plant-wide seniority, and in a business like the machine tool business, it works a very great hardship not only on the men but on management. Our basic operations start in the foundry and follow clear through to final assembly. When operations slow up, naturally the foundry slows up first. We, however, in the past two or three years have been obliged to lay off men in the assembly departments when we needed them badly and replace them with men with greater seniority from other departments. Our present working force is now down to a little over 400 people, and the bulk of these men have been with us for 15 years or more. To answer the direct question as to where those several hundred men whom we have laid off in the past two or three years have gone, we do not know. If a sudden demand were placed upon us to step up production, such as an immediate war demand, it would be almost impossible to rehire the same men that we have let go. This is a situation in the machine tool industry today that ought to cause grave alarm to our armed forces. I hope that answers the question.

QUESTION: Sir, you mentioned in the course of your talk that priority order E-1-b was pretty generally acceptable to the machine tool industry during the war, that it did a pretty good job. You also mentioned the names of the two gentlemen who were instrumental in its drafting, and I take it, in its operation. I am wondering, sir, if you could tell us what link there is between E-1-b as it existed during the war and now, if there has been any continuity of thought, if the efforts of these two men have been wasted, or if they are available now and what are they doing.

MR. AYR: Well, Major Reimel, of the Ordnance Department, now Brigadier General Reimel, retired, and Captain Henning of Navy Ordnance were the two service officers along with other civilians who really sponsored and put into effect priority order E-1-b. Early in my paper I outlined some of the causes which led up to this E-1-b order. Broadly speaking, the idea was to divide the production of the machine tool plant 75 percent for domestic needs and 25 percent for overseas and consumer needs. If the latter category did not require more than 20 percent of the machine tool builder's output, then an additional 5 percent was devoted to the war needs and the domestic war needs. To answer the rest of the question, I may state that both General Reimel and Captain Henning, along with Herbert L. Tigges, Vice President of Baker Bros., have headed

up the Machine Tool Section, for the last two years, of the National Security Resources Board. The early efforts of this Board were to place in various plants phantom orders, the materials for which were all to be processed on purchase orders placed, such as for electric motors, gray iron castings, forgings, and so on, but actually no definite orders were to be issued until D-day might arrive. I personally regret that nothing further has come from these phantom orders, and that as of today the NSRB, so far as the machine tool industry is concerned, is practically out of business.

QUESTION: Sir, do you see any way for your industry to find padding jobs, and if you did find a padding job, would your Union stop you from working on something other than machine tools?

MR. AYR: Oh, no, the Union would be delighted because any additional work in the shops means more employment for the men. Along this line of thought, several of our Union men in company with our General Sales Manager spent two or three days in Washington attempting to contact our Senators and Congressmen with a view to getting some consideration for contracts other than machine tools. These men were well received by our Congressmen, but nothing ever came of the visit. Our company at the moment has professional engineers out in an endeavor to find other lines of manufacture. We also have representatives in Washington attempting to secure war contracts for us. We have been terribly disappointed in the over-all results to our industry from ECA. It is a fact that the Hendey Machine Company has participated very little in foreign business since the Marshall Plan went into effect. There are several reasons for this. Immediately following the war, Great Britain passed a law prohibiting the import of any machine tools which could be made in the United Kingdom. Following that, our own Congress passed a law prohibiting us from shipping any machine tools to Russia or her satellite nations. Third, the French people promptly started using American dollars to build machine tool shops of their own, so that practically all our foreign business which we used to enjoy has ceased to exist. I think I mentioned earlier that 36 machine tool companies have gone out of business since the war. Twenty of those 36 have been absorbed by other industries. This, gentlemen, is a most serious situation. When the United States got into World War II our machine tool shops were humming. My own company had two shifts going, largely because we were shipping to Russia, Great Britain, and France; our domestic demand was at the high peak.

QUESTION: Isn't it a fact that both Reimel and Henning are still pretty active in NSRB now? Mr. Reimel has an all-time job with some association connected with our industry. Henning also has an all-time job. They are available and are still members of NSRB.

MR. BERNA: They are consultants down here.

QUESTION: Sir, is there any indication of any revolutionary change in the nature of machine tools coming up that might afford some sort of relief? We have had some indications in some of our lectures here not directly but indirectly that there might be such changes. For instance, we have heard some talk about not automatic tools, but automatic plants. We also heard about the extensive use of new grinders due to better grades of abrasives to replace milling machines. Is that a very bright picture for the future of the industry?

MR. AYR: Of course, there are changes in design and changes of methods going on all the time. New tools with new applications are being introduced into industry almost daily. I saw a job performed in our shops the other day on an engine lathe with a duplicator attachment in 5.5 minutes which used to take 45 minutes. Jet turbines have created many problems for our manufacturing industries, particularly machining of the turbine blades. Perhaps Mr. Berna can tell you more about that than I can.

MR. BERNA: Your reference to making the blade out of powdered metal which is compressed into the die--after these blades have been cast, they are machined to very fine tolerances. Most of these new developments in the laboratories are basic. They are simply refinements and improvements and don't amount to anything if the customer doesn't buy the machines that embody them.

MR. AYR: That's right. In other words, in our industry a machine tool is called a single purpose tool when it is designed and built around a particular job. General purpose machine tools such as milling machines, lathes, shapers, drills, and so forth, are not in that category. The general use of carbide tools throughout manufacturing today has also been tremendously helpful in speeding up production and cutting costs.

QUESTIONER: I am going to try the neat trick of agreeing and disagreeing with you at one and the same time.

MR. AYR: That's nothing unusual.

QUESTIONER: It is not uniform if you are referring to the appointment of a chairman for the National Security Resources Board. I think everybody realizes that the appointment needs to be made as quickly as possible. But if you are referring to legislation which, I think, is the main thing you are concerned with, that is not the question. Back in 1870 when France declared war on Prussia, someone woke Bismarck up in the middle of the night and told him war had been declared. He said, "Go to my desk, look in the left-hand top drawer and pull out the plan marked A." Bismarck then rolled over and went back to sleep. Now, where I am in agreement with you is that we ought to have such a plan so that Mr. Truman could say, "Pull out plan A" and roll over and go back to

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sleep if he could. But the trouble with the thing is, and this is a sad commentary on the American people, if they pass that legislation now, it would be so riddled with politics that it wouldn't be worth a hoop. I would like to have your comment on that, Sir.

MR. AYR: Well, I can't disagree with you at all. I think your statements are true and they are to the point. I don't know whether you can have a plan without revising it occasionally. I was very active, and I think some of you gentlemen may have been too, in the Springfield Ordnance District. We had several of our engineers receive commissions in the Ordnance and they put in hundreds and hundreds of hours in the evenings on their own time trying to work out practical plans so that when M-day came, we would be in a position which you have suggested, namely, having a workable plan all ready to pull out of the drawer. After we had been engaged in World War II for a year or more, I wanted to know what had happened to the efforts of the men in the various Ordnance offices who had been working all these years to compile data and set up a plan for M-day. I was informed that after war broke out practically all the work done by those officers during peace years amounted to practically nothing when M-day did arrive. Have any of you gentlemen had any closer contact with this situation?

GENERAL HOLMAN: I am afraid I have to arise to the occasion, Sir. I have been associated with the District for about 25 years. I cannot quite agree that the value of their work in production years was passed over. There were instances where plans of prime contractors made on certain assumptions did not precisely click with the way in which we got into the war or with what happened after we went from normal peacetime through several years of lend-lease and perhaps into war itself. But I can assure you that in all those districts the people who had interested themselves in the work in many, many cases continued on throughout the war period. There have been two histories written on the Ordnance Districts, one immediately after the war in the New York District, the other just recently on the Philadelphia District. Those histories, just to take two examples, are replete with an account of the prewar planning and with what happened during that period. I can hardly agree with you, though, that it would not have been like that if a plan could have been prepared, say in 1925 or 1930 that could have been pulled out of the desk drawer. You have to make so many assumptions as to what a particular situation would be at the time, so many assumptions as to requirements, that it is very difficult. But the fact that the officers are there, that they are planning, that they are interested in the situation and are now what might be called a running estimate, I think is very helpful.

MR. AYR: Thank you, General. You have heard the General make his remarks. I know he was close enough to the situation so that his remarks are actual facts. I was only thinking that, from a personal standpoint, I had done a great deal on the compilation of a book dealing

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with machine tools which covered design, inspection, and so on. A tremendous amount of work was put in on that book, but so far as I know, it was never used as a handbook for use in the Ordnance District for the purchase and installation of machine tools. This book, however, was a fine piece of work and a similar one should be compiled after five years or more. Gentlemen, the plans you make today which would suit the situation as of today cannot be pulled out of the drawer five years from today and be workable. Methods and conditions are changing a lot faster today than they did in Bismarck's time.

COLONEL MEETZE: I am very sorry our time has come to an end, but anyway, the southern accent salutes the Scottish brogue. On behalf of the Commandant of the Industrial College, I thank you for this highly informative lecture on the machine tool industry.

MR. AYR: Thank you very much, Colonel Meetze.

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