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# The Effect Of War On Young Engineers Inducted Into Industry

M. M. BORING

(EDITOR'S NOTE—This article is of such a nature that an editorial in this issue would be superfluous. Mr. Boring is in the Engineering General Department of the General Electric Company.)

The war is bringing to engineers and other college people a completely new set of experiences. The colleges themselves will feel the most immediate effects, and these are already indicated by the much-discussed speed-up plans, and by the plans for inducting young men into the Navy, the Signal Corps, and other branches of the military service. The trend in college education indicates that a large percentage of those young people who normally would come into industry in the next few years will be diverted into military channels, and a decreasing number will be available to industry.

Only a few years ago it was stated that the colleges were producing too many engineers. Many of the schools were encouraged to, and did, reduce the number of men graduating. We now find a complete reversal of the situation, with a shortage of technically trained people that is estimated, from some sources, as high as 100,000 men. In addition to this extreme shortage of men in the industrial world, there is the tremendous demand for men in the Army and Navy.

Because of this, and because of the extreme increase in production, the manufacturers, public utilities, and other organizations which employ the engineering graduate, have been forced to change many of their policies. The immediate effect on the young engineer as he comes to the industrial organization will be a drastic shortening of the normal training period; he will be given less guidance and less opportunity to grow slowly and naturally. To meet the crucial time limits of war demands for industrial production, the normal procedure for steps of individual advancement as skill and experience are acquired must be set aside "for the duration", and men must be thrown into positions of advanced responsibility with minimum preparation. This will mean to the individual young engineer increased responsibilities—probably in many cases well beyond his real ability and it will certainly mean that he will be forced to work harder and under conditions far less favorable than he has before experienced. The tremendous changeover from peacetime equipment to war production, with its restrictions, shortage of raw materials, lack of machine tools, and other equipment, is certainly going to tax the

ingenuity of young men as never before. Unfortunately these abnormal conditions—acting as they do to thrust young men so quickly into positions of greatly advanced responsibility, and in many instances giving men just out of college an income far above the level that could be expected under normal conditions—are apt to give the young men graduating today a false sense of values. It is essential for young men to remember that this is a transient condition from which a return to normal is inevitable. The far-seeing young man will prepare against this inevitable future readjustment on the one hand by making the most of his enhanced opportunities to acquire skill, judgment, and experience, and on the other hand by conserving his currently abnormal remuneration to assure buying power later on.

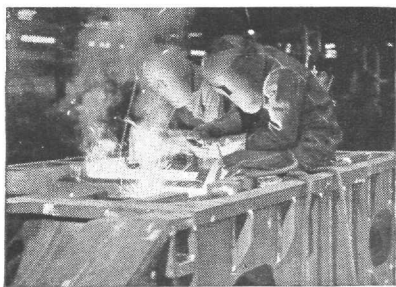
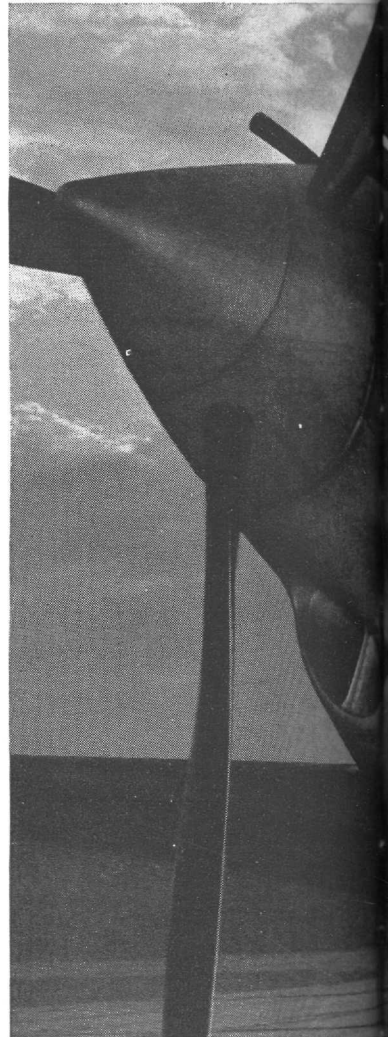
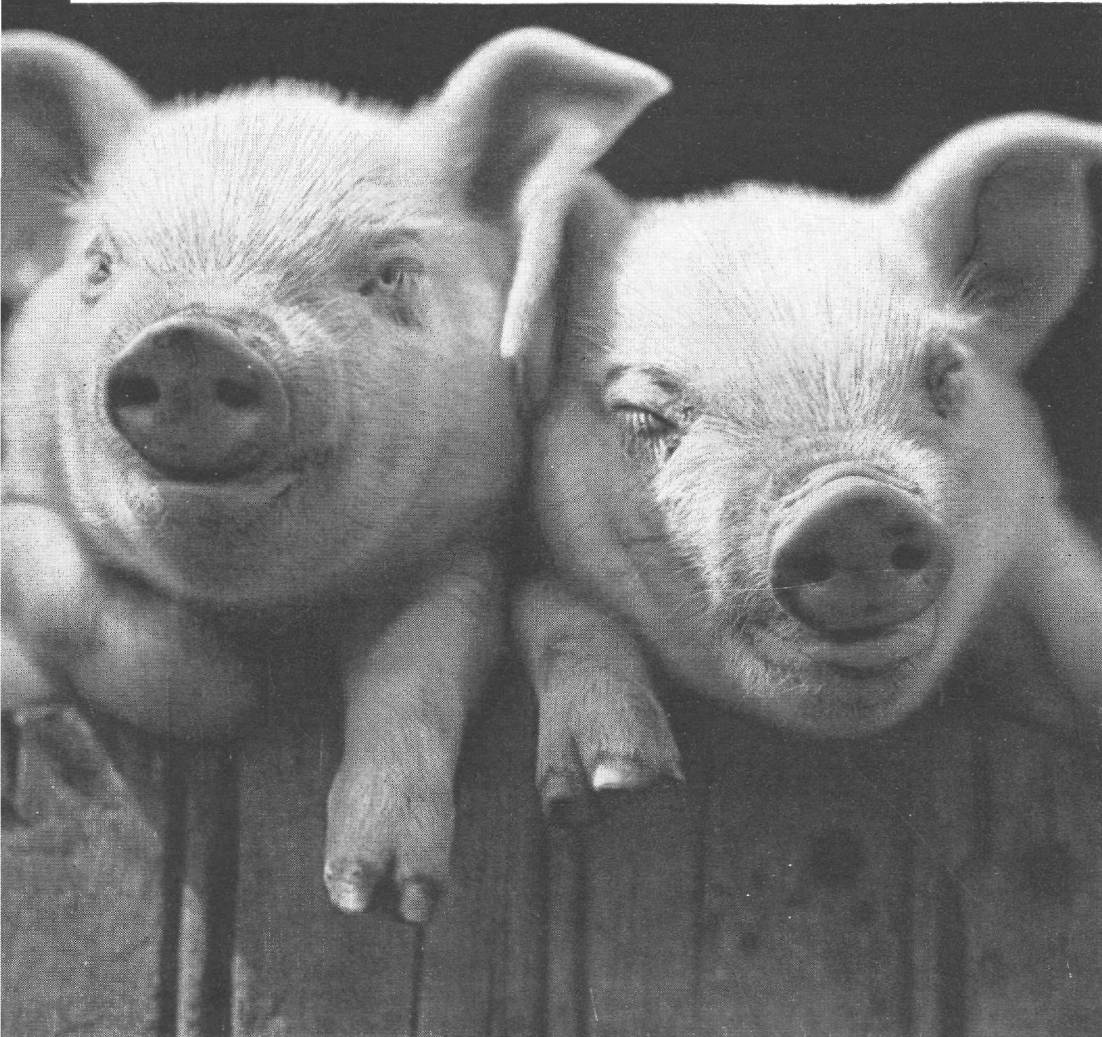
Many of the young graduates have developed a jittery attitude and question whether or not the particular small bit they can do in industry toward the war effort is as useful as their services would be if they were actually carrying guns. The shortage of men in the industrial field, therefore, is increased because many young men decide that they should enlist in some branch of the armed service, instead of taking industrial jobs.

We older people should advise young men to go slowly in making decisions of this kind. It has been stated that it is necessary to maintain 14 people in the production of war goods in order to keep one man in the field. In the last war this requirement was estimated at  $2\frac{1}{2}$  people, which indicates the comparative technical changes in the last 25 years. If we build up an army involving several million men, as we expect to, it will be necessary for industry to accumulate 50 to 60 million more workers than we now have, and all of the war material that must be created by this tremendous number of people is so technical in nature that our Army will be unable to function without having in industry a high percentage of technically trained men who can use their engineering talent for this purpose.

Various representatives of the armed forces have recently been approaching students in colleges and young engineers in industry with proposals that these men should immediately join

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# Fatter Porkers...Faster



A-C Welders now work exclusively on machinery for the war effort.

ALLIS-CHALMERS farm and milling equipment helps produce corn for U.S. porkers and steers . . . wheat for 8 of every 10 bread loaves produced in the U. S. A.

Allis-Chalmers industrial equipment (more than 1,600 different capital goods products) works in every war industry . . . helps produce planes, tanks, ships, guns at a rate which must make Hitler shiver!

And Allis-Chalmers engineers—cooperating with plant engineers in every part of the

country—are helping manufacturers produce more—not just with new machines, but with machines now on hand!

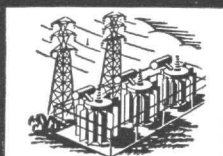
Every Allis-Chalmers man and woman is working *all out* for Victory. Our one job right now is winning this war. But from this war work we are gaining rich production experience which will be invaluable to the Nation when the war is over. We'll be ready to help build a better peace!

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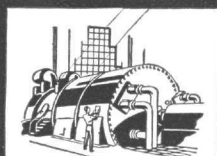


# ALLIS-CH

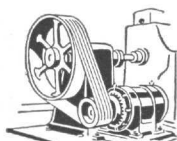
OFFERS EVERY MANUFACTURER EQUIPMENT AND ENGINEERING CO.



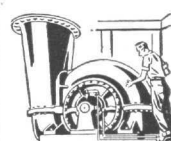
ELECTRICAL EQUIPMENT



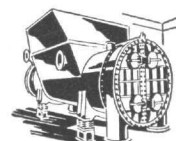
STEAM AND HYDRAULIC TURBINES



MOTORS & TEXROPE V-BELT DRIVES



BLOWERS AND COMPRESSORS



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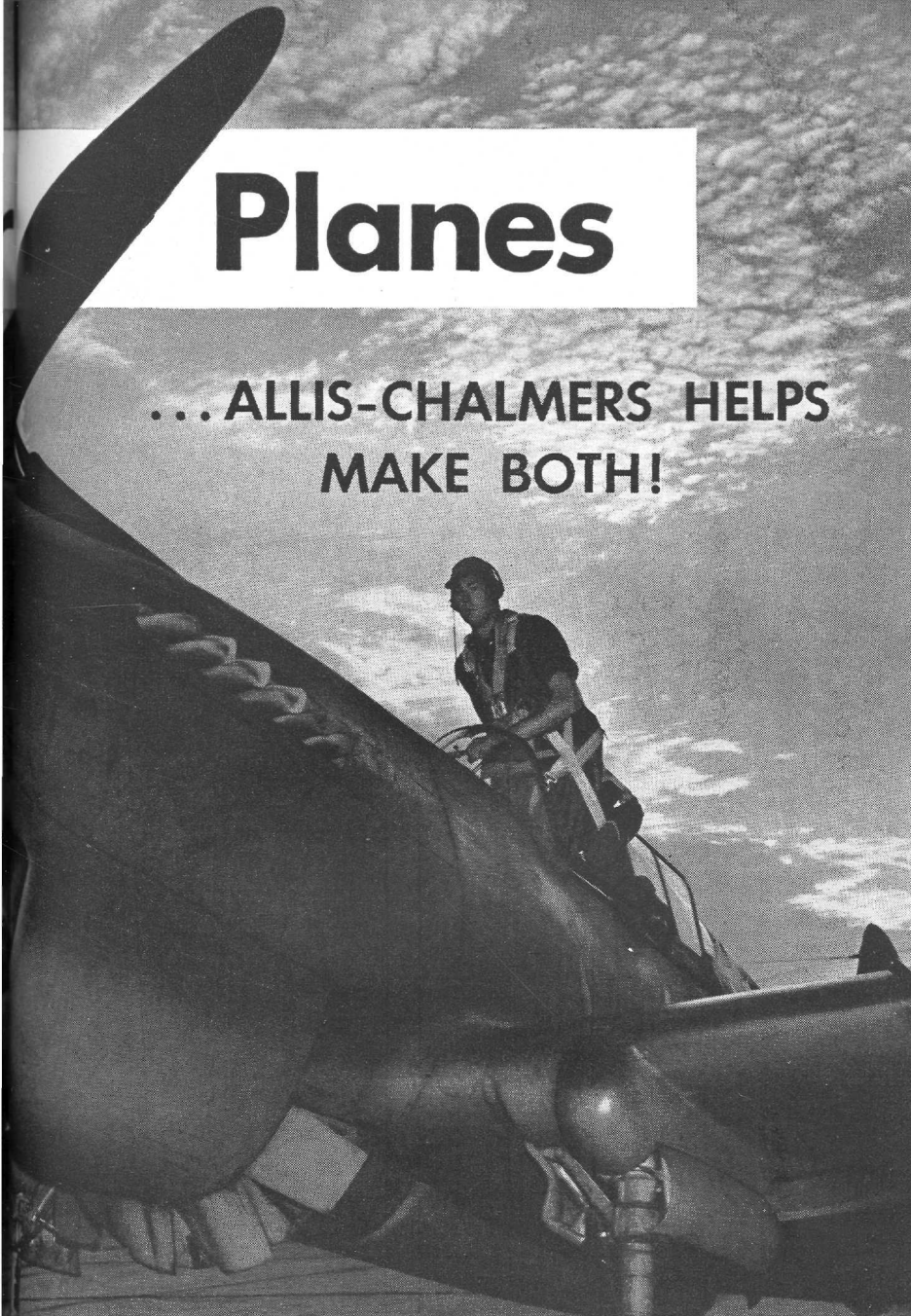


CENTRIFUGAL PUMPS



# Planes

... ALLIS-CHALMERS HELPS  
MAKE BOTH!



## VICTORY NEWS

**Inland Shipyards:** Hundreds of A-C pumps, motors and V-belt drives are at work along the Great Lakes helping in the greatest shipbuilding activity this region has ever known.

Ore carriers, tankers, cargo vessels—even submarines—are being built here.

Tremendous expansion of facilities was required to meet the goals set—and equipment for the yards, as well as for the ships, has left A-C plants in great quantities.

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Published by ALLIS-CHALMERS MFG. CO. MILWAUKEE WISCONSIN

**FREE!**  
Contains No Advertising

**New 16-Page Book** applies to all makes of V-belts—tells how to conserve rubber through correct V-belt maintenance: how to measure proper tension; what determines "life expectancy"; what to do about worn sheaves; much other useful information. Liberally illustrated. Ideal for training new men. Write for your free copy.

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**FOR VICTORY**  
Buy United States War Bonds



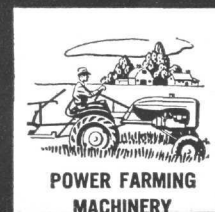
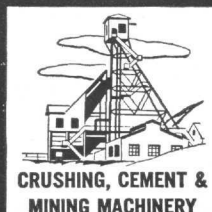
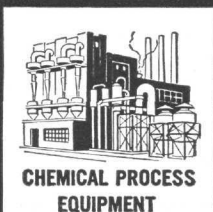
Allis-Chalmers makes the greatest variety of capital goods products in the world.



Rubber boats, tires, balloons are made with the aid of Allis-Chalmers equipment.

# ALLIS-CHALMERS

OPERATION TO HELP INCREASE PRODUCTION IN THESE FIELDS...



## EFFECT OF WAR ON YOUNG ENGINEERS

*(continued from page 13)*

the armed forces. Some of these statements seem to be diametrically opposite to the thinking of the Selective Service. It would certainly be unwise for the armed forces to draw from important war industries highly trained technical people whose entire effort is directed toward the production, development, design, testing, or manufacture of devices badly needed by the Army and the Navy. These industries, which have turned over their complete manufacturing force to the war effort, today cannot in any sense of the word be considered as private industries, but are now definitely government arsenals. In support of this view, an official of the Selective Service recently stated that taking men from industries of this type would be analogous to taking away their raw materials and yet requesting that they produce more finished products.

Professors, on the one hand, have been advised to tell students that the chances of getting more than one six months deferment were practically nil. On the other hand, instructions to draft boards have clearly stated that young men actively engaged in the production of war goods will be granted additional requests for deferment, as long as they are vitally needed by the war production effort. Also, many colleges have been instructed to write to the electrical engineering graduates of the last 10 years, encouraging them to leave their present war production jobs to take special courses in ultrahigh frequency phenomena, with the idea of working toward commissions in the Signal Corps. Surely, under the present conditions, it would be most unfortunate if there was a large exodus of engineers from war industries under this sort of plan.

So our advice to young men should be, at least now when production is needed so badly, to enter industry. Later, when the right time comes, when there is a good flow of production, and when the creative thinking of the engineer is not needed so badly to produce war goods, then you, as young engineers, should be ready to take your abilities to the armed forces, to use, and to teach the layman how to use the things that you have built. In other words, we should say to you that you should keep your heads, use your common sense, and make the same type of analytical study of this war problem as you would of an engineering problem.

As to the future, older people who have been involved in the production of materials are leaving to you a most unusual heritage. We are going to leave you a world torn by war, in which we shall expect you to correct the social structure and the economic structure, as well as to rebuild the

physical things. Not only will you be responsible for the physical rebuilding of Europe, and for paying for that job, but also for finding a way to create in European countries the same standard of living that we in the United States enjoy, so that those jealousies that eventually break out into actual wars will be eliminated. You must take a larger part in the economic and social phases of our civilization than engineers have ever taken before.

I have found from my experiences in contacting young men that most of them seem to think that their entry into industry will be only temporary, and that a complete collapse in the industrial world will come at the end of the war effort. Yet history shows that even though there may be a short, deep depression immediately after the war, caused by the readjustment necessary in changing from building war material to producing goods for peace, this should be followed by a long period of high productivity.

In addition to the rebuilding necessary because of the destruction of cities, factories, transportation, and other necessities, you will be faced, as no engineers have been before, with the problem of catching up with the building of the materials that have been necessarily neglected. This obsolescence, caused by the war and by the long depression that preceded the present conflict, will be at the greatest point in history. The fact that there has been practically no building of homes, heavy transportation facilities, or power-generating equipment for nearly ten years indicates that there will be great shortages facing us immediately after the war is over.

After all, regardless of wars or of depressions, young men grow at a fairly uniform rate. It has been my experience that every job has certain changes in it about every five or ten years, so that at least part of its responsibilities are taken by a new individual. Under these conditions, we must realize that there is a fairly rapid turnover of men in all jobs—administrative, technical, and skilled—so that you as young people will, when the time comes, have the complete responsibility of running industry, and your only competition will be with others of your own age. You will not compete with older or with younger people. When the time comes, you can be perfectly sure that some of you will hold high executive positions in the great manufacturing companies, that all of the older people will make way for younger men, and that you will have unquestionably the greatest opportunity in history for the reorganization of our civilization.

Undoubtedly we must all expect some decline in our standards of living, but surely the American people are not ready to give up permanently

*(continued on page 27)*



## The Goblin that works for America

THE INQUISITIVE alchemists of the Middle Ages were looking for silver. Repeatedly, they smelted certain ores and got a silvery-looking metal. But it was only *silvery-looking*. It never turned out to be silver. So the alchemists thought that a malicious spirit was thwarting them, and they called the strange metal Kobold, meaning goblin.

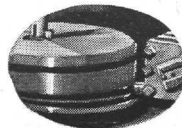
Today that same goblin, known in America as cobalt, has become one of this country's great fighting elements. Cobalt is alloyed with chromium and tungsten to make "Haynes Stellite" alloys which have the property of "red hardness." Metal-cutting tools made of these alloys keep on cutting even when red hot! Cobalt improves red hardness and toughness in other kinds of metal-cutting tools. Thus, cobalt has contributed greatly to the tremendous output of planes, tanks, guns, and other war materials.

Cobalt is also used to produce improved magnet steels. Permanent magnets of cobalt-tungsten steel are more powerful, and last longer. Permanent magnets are necessary in much electrical equipment.

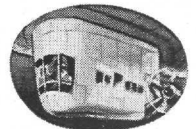
This country's cobalt formerly came from Belgium, where it was refined from African ores found in the Belgian Congo.

As war clouds loomed, and as accelerated American industry made rapid inroads on the stockpiles shipped out of Belgium during 1938 and 1939, ELECTRO METALLURGICAL COMPANY, a unit of UCC, designed and built facilities in this country for the Belgians. ELECTROMET now operates these facilities so that HAYNES STELLITE COMPANY, another Unit of UCC, and other American companies can have the cobalt they need for essential war work. Operations began in 1941. Today, these facilities annually produce more cobalt than was ever imported in any year previously.

**BUY UNITED STATES WAR BONDS AND STAMPS**



**RED HOT... STILL CUTTING!**  
Faster production of metal equipment of all kinds is made possible by high-speed metal-cutting tools containing cobalt.



**SIGHTED SUB!** Better radio transmitting tubes and improved electrical equipment are assured by cobalt.



**CALLING HEADQUARTERS!**  
Telephones and other electrical equipment require permanent magnets. The better magnet alloys contain cobalt.



**WEAR-FIGHTER!** Planes fly farther with fewer repairs, thanks to exhaust valves protected with "Haynes Stellite" cobalt-chromium-tungsten alloys.

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The Oxweld Railroad Service Company  
The Prest-O-Lite Company, Inc.

### PLASTICS

Bakelite Corporation  
Plastics Division of Carbide and Carbon Chemicals Corporation

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## EFFECT OF WAR ON YOUNG ENGINEERS

*(continued from page 24)*

the motor cars ,the radios, and the refrigerators that we have enjoyed in the past, in some way it will again be possible for the man who builds the automobile to buy the radio, the man who builds the radio to purchase the refrigerator, and so on. Since this is so, I believe we can assure you that the period of rebuilding following this war effort will be an extremely interesting one, that you will have a job to do, that you will have plenty of responsibility, and that you will have grand fun doing that job.