

"I have read and studied the objections to the CIO's aircraft production program. Virtually all of these criticisms have been anonymous, aircraft and automotive industry executives refusing, for some reason, to lend their names to their printed views. The criticisms do not in any case run against the feasibility of the program. By and large they indicate either a sad lack of imagination or an insistence by automotive interests to continue with 'business as usual'.

"Since most of the criticisms have been anonymous and since we are shortly to have a conference with Mr. William S. Knudsen and defense commission production experts on our program, I have hesitated to engage in public discussion on these matters. However, so many misconceptions on our program have gained credence that I think it advisable to discuss and dispose of these matters at this time.

"**BOMBERS OR PURSUIT SHIPS.** It has been wrongly assumed that the CIO program contemplates the production only of pursuit ships. Our reference to the possible production of 500 fighting planes a day was used only to indicate the overall productive capacity of an automobile industry whose idle machines and idle men were fully mobilized and whose private interests were temporarily subordinated.

"The productive capacity we have indicated can as readily be adapted to the production of medium-sized or heavy bombers. If these latter types are built rather than pursuit ships, the daily production would be scaled down in proportion to the increased amount of work required on each plane. Nevertheless, our program could build many more bombers, large or small, than are now being built or are contemplated, and in much shorter time.

"**"PRESENT" USE OF FACILITIES.** When the program was first made public, it was argued that the facilities of the automobile industry are already being employed for production of aircraft parts. Since then, to an appreciable extent as a result of the publication of our program, more extensive use of the automobile industry's facilities is being planned. However, our surveys indicate that not ten per cent of the available facilities are being brought into play for defense purposes.

"The present plans for production of parts for bombers in auto plants is based upon the conception of 'business as usual'. These plans do not contemplate the coordination and full use of facilities which alone can produce a large number of planes within a comparatively short period.

"**PLANNING CAR PRODUCTION.** We have proposed that idle and partially idle plant facilities can be fully used only by leveling automobile production over a twelve-month period, thus freeing a great part of the industry for defense production. It has been asserted that production cannot be leveled off because the industry cannot anticipate orders for cars and must supply these cars during the seasons when the people want them.

"These objections imply that the American public is so slightly concerned with national defense that it will not wait a month or several months for new models. We believe that the car-buying public realizes that new models with the latest gadgets and improved lines will be of little value to a populace that may have to live in subways and air-raid

shelters. We believe that the car-buying public will wait. If all companies cooperate, none will gain competitive advantages over the others. Refusal to cooperate, it seems obvious to us, would bar the products of any company from the consideration of the average American.

"As for planning 12 months production of motor cars and trucks: a simple understanding of economics would indicate that the increased purchasing power of the American public will warrant the same high rate of production as during the last 12 months.

"DISLOCATION OF THE INDUSTRY. Automobile industry trade journals and others have argued that our plan would 'dislocate' the automobile industry. Our plan would work to the contrary. The leveling off of production would, for the first time, permit the manufacturers to plan ahead for 12 months. It would eliminate the tremendous peaks and valleys in employment which for many years have worked such hardships on more than half a million automobile workers.

"Furthermore, the production of defense planes in addition to automobiles would make the industry a two-product industry. This may well offer a permanent solution of serious problems of both manufacturers and workers. It would give the former full use and return on their tremendous capital investments; it would give the workers year-round employment.

"MAN-HOURS REQUIRED. While some sources in the automobile industry declare that existing idle machinery cannot be adapted for aircraft production they are contradicted by still other automobile sources which admit that idle machinery is available and adaptable. Some of the latter, however, assert our plan is impractical because of the relatively small percentage of machine hours in manufacturing an automobile as compared with the total man hours required to build a plane.

"These sources contend that out of 18,000 man-hours necessary to build a pursuit ship, 10,000 are devoted to construction of air frames, work on which is usually done by hand. In attempting to prove their point, these sources simply multiply 10,000 man-hours by 500 planes a day which gives them a tremendous and impressive figure. It would be as logical to take the number of hours required to custom-build a Chevrolet car by hand and then multiply this figure by Chevrolet's daily production and use that tremendous figure to prove that Chevrolet could not possibly produce 6,000 cars a day.

"The persons who argue thus speak of mass production quantities but use the mathematics of custom-built production methods. It is an elementary fact that the number of hours spent doing things by hand as compared to the number of hours spent operating machines (machine-hours) varies in ever increasing proportion to the extent that mass production techniques are introduced into the production process.

"The number of hours spent in building an automobile is less than one-sixth of what it was when the industry started, and as the overall man hours decrease the machine hours increase in percentage as compared to the work done by hand. One can go into a modern continuous strip steel mill and see this in its sharpest form.

"FLOOR SPACE REQUIRED. This same mistake of thinking of mass production of planes in the mathematics of custom-built hand production also raises the question of the practicality of providing the necessary floor space for assembly work. Another elementary fact is that the number of days necessary to complete the production cycle (in machining and fabricating industries such as autos and aircraft) is shortened in proportion to the extent that mass production technique is applied.

"The shorter the production cycle the less floor space is needed. This is true because the number of jobs in the process of production is held at a minimum. If Chevrolet Motor Car Company had to build 6,000 cars a day by the same methods that are now being used to build planes, the total man power and floor space of the entire automobile industry would not be adequate to turn out its present production.

"Our original report cited the availability of floor space—785,000 feet—at the Hupmobile plant, in Detroit, for the assembling of motors. We cited the availability of the unused floor space in the Fisher body and other body plants for sub-assembly work on fuselage and wing sections.

"A further striking example of available floor space is the Reo plant at Lansing, Michigan, which has the following vacant space: Mt. Hope Avenue plant, 553,237 square feet; Building No. 4800, 247,931 square feet; Building No. 4700, 104,247 square feet. In Reo's main plant 500,000 square feet is fully equipped with production machinery. Starting January 13, Reo will be producing five motors per day in a plant that at one time produced 160 truck and 125 passenger cars in one eight hour shift.

"The objections raised on the alleged scores that a prohibitive number of man-hours and plant space would be required for mass production of aircraft do not hold water when considered in the light of the above facts.

"DIFFERENCES IN ENGINES. Doubts have been expressed on the adaptability of automobile production machinery to production of aircraft motors because of the reduced weight of aircraft motors. These doubts are without foundation.

"The reduced weight of an aircraft motor per hp as compared with automobile motors is secured firstly by the difference in the design of the motor and secondly by the fact that all parts of an aircraft motor are reduced to a minimum weight by removing all surplus metal.

"This is done by a process of machining. The same basic machinery is used to machine parts for an aircraft motor as for an automobile motor, excepting that a more complete and precise machining job is done in the case of the aircraft motor. The available machinery in the automobile industry can be re-tooled to turn out aircraft motors of 1,000 or 2,000 hp of either the air-cooled or liquid-cooled design.

"The objection has also been raised that aircraft engines must be made in more precise dimensions than automobile engines. As our original program pointed out, more precise parts are obtained by more precise tooling.

"SHORTAGE OF ARMAMENTS. Any possible bottlenecks in armaments, instruments, etc., is not a legitimate criticism of our plan. Such bottlenecks can be met if production of such armament, instruments, etc. is spread over existing industries whose machine capacities and production facilities are adaptable to such production. The pooling of such productive capacity with central assembly plants using the same approach we suggest for aircraft production will make it possible to eliminate any possible bottlenecks in armament, instruments, etc.

"SIMILARITY OF BASIC MACHINERY. In our original report we stated that basic machinery used for automobile production can be adapted for producing aircraft parts. We stated that precise and difficult parts of the Allison engine are being made in the old Cadillac plant in Detroit with machinery which duplicates existing unused automobile plant machinery.

"These statements have been challenged in some quarters. Herewith is

"FLOOR SPACE REQUIRED. This same mistake of thinking of mass production of planes in the mathematics of custom-built hand production also raises the question of the practicality of providing the necessary floor space for assembly work. Another elementary fact is that the number of days necessary to complete the production cycle (in machining and fabricating industries such as autos and aircraft) is shortened in proportion to the extent that mass production technique is applied.

"The shorter the production cycle the less floor space is needed. This is true because the number of jobs in the process of production is held at a minimum. If Chevrolet Motor Car Company had to build 6,000 cars a day by the same methods that are now being used to build planes, the total man power and floor space of the entire automobile industry would not be adequate to turn out its present production.

"Our original report cited the availability of floor space—785,000 feet—at the Hupmobile plant, in Detroit, for the assembling of motors. We cited the availability of the unused floor space in the Fisher body and other body plants for sub-assembly work on fuselage and wing sections.

"A further striking example of available floor space is the Reo plant at Lansing, Michigan, which has the following vacant space: Mt. Hope Avenue plant, 553,237 square feet; Building No. 4800, 247,931 square feet; Building No. 4700, 104,247 square feet. In Reo's main plant 500,000 square feet is fully equipped with production machinery. Starting January 13, Reo will be producing five motors per day in a plant that at one time produced 160 truck and 125 passenger cars in one eight hour shift.

"The objections raised on the alleged scores that a prohibitive number of man-hours and plant space would be required for mass production of aircraft do not hold water when considered in the light of the above facts.

"DIFFERENCES IN ENGINES. Doubts have been expressed on the adaptability of automobile production machinery to production of aircraft motors because of the reduced weight of aircraft motors. These doubts are without foundation.

"The reduced weight of an aircraft motor per hp as compared with automobile motors is secured firstly by the difference in the design of the motor and secondly by the fact that all parts of an aircraft motor are reduced to a minimum weight by removing all surplus metal.

"This is done by a process of machining. The same basic machinery is used to machine parts for an aircraft motor as for an automobile motor, excepting that a more complete and precise machining job is done in the case of the aircraft motor. The available machinery in the automobile industry can be re-tooled to turn out aircraft motors of 1,000 or 2,000 hp of either the air-cooled or liquid-cooled design.

"The objection has also been raised that aircraft engines must be made in more precise dimensions than automobile engines. As our original program pointed out, more precise parts are obtained by more precise tooling.

"SHORTAGE OF ARMAMENTS. Any possible bottlenecks in armaments, instruments, etc., is not a legitimate criticism of our plan. Such bottlenecks can be met if production of such armament, instruments, etc. is spread over existing industries whose machine capacities and production facilities are adaptable to such production. The pooling of such productive capacity with central assembly plants using the same approach we suggest for aircraft production will make it possible to eliminate any possible bottlenecks in armament, instruments, etc.

"SIMILARITY OF BASIC MACHINERY. In our original report we stated that basic machinery used for automobile production can be adapted for producing aircraft parts. We stated that precise and difficult parts of the Allison engine are being made in the old Cadillac plant in Detroit with machinery which duplicates existing unused automobile plant machinery.

"These statements have been challenged in some quarters. Herewith is