Panorama of the skyline of Tokyo at night. This section of the city is occupied chiefly by Government buildings

Heinz

Jap War Industry Concentrations Beckon Our Heavy Bombers

HOWARD SNYDER*

FLYING west from Tokyo, over the Island of Honshu, and across the Inland Sea to Yawata and Shimonoseki on the Island of Kyushu, you pass over the greatest concentration of industry in the world. Even Britain's industries are not packed so closely together as are those of *Dai Nippon* (Great Japan) in this short ribbon of land and sea.

The eighteen miles separating Yokohama from Tokyo have been built up almost solid with war industries. This area is commonly referred to in Japan as the Kwanto, and has a population of 11,000,000.

Along the great highway from Yokohama to Osaka and Kobe, in the middle portion of this industrial area, are six vital and colossal industrial centers.

A seventh industrial area is at the west end of the Inland Sea, at Yawata, where a branch of the giant Japan Iron and Steel Manufacturing Co. turns out 90% of all *Dai Nippon's* pig iron. It is the backbone of all her war industries.

In the middle of this vast concentration of industry is the city of Nagoya. It lies about 230 miles west of Tokyo, and is on the national highway which runs from the Kwanto to the Kinko (Osaka, Kobe, Kyoto area), at the eastern end of the Inland Sea, and then across the western end of Honshu Island, over the narrow channel to the Island of Kyushu, and then on to Yawata. Yawata—the steel city—has a population of about 500,000.

Center of Aircraft Industry

Nagoya is the big aircraft center of Japan, home of Mitsubishi Heavy Industries, Ltd., which turns out the famous Mitsubishi-00 or *Zero* fighter, together with bombers, torpedo planes, transports, and flying boats. In this smoky city also is a branch of the Nakajima Aircraft Co., manufacturers of engines and electrical equipment for aircraft. These companies produce Japan's best airplanes and engines. When Nagoya's industrial heart ceases to beat, then *Dai Nippon's* planes will cease to take to the sky.

Nagoya, therefore, is one of the most vital targets in all Japan for our bombers. It has a population of over 1,000,000, and is the home of many other industries in addition to aircraft. Here are located chemical plants and locomotive works. Textiles, machine tools, and gunpowder are also manufactured there.

It could rightly be called the Chicago of *Dai Nippon*, for it is the center of Japan's network of railroads, and has a huge harbor with anchorage and docking facilities for many ships.

Nagoya is located at the head of Atsuta Bay, and, unlike most of Japan's cities, is built on a widespreading plain, the Owari Plain. Business sections of the city are full of concrete and steel buildings, but other parts are vast forests of wooden boxes—tumbled together with only narrow trails for streets between the endless rows of shacks which hundreds of thousands of slave-like workers call home.

In Nagoya, the author lived in a tin and paper-pine-board box of one room, one electric light bulb, a one-stool privy in a corner of the single room, and with an open cesspool beneath the house. There was no chimney, no water except that which was carried in a wooden bucket from a neighborhood hydrant, and no furniture.

The nearest neighbor's house was three feet away. The air was always bad-smelling, and the dirt road between the rows of shacks usually muddy.

Charcoal is the universal fuel in

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Japan. Now it is rigidly rationed and only enough for the absolute minimum of cooking (not enough to warm over the rice and soya bean soup) is permitted. None whatsoever could be had for heating the room in spite of the fact that winter in Nagoya is raw, chilly, and damp—like winter in Mobile.

Aritoma Matsumoto was the nearest neighbor on the right. He was married and had five children, four at home and one in China. He was a machinist for Mitsubishi Heavy Industries, Ltd. His hours were 16 per day, 7 days a week. He could neither quit his work nor take a day off. A failure to report to work was immediately investigated by an officer. All labor was under the direction of the military.

Aritoma worked in unison with many others in his department. Work was directed by an overseer who used a whistle frequently, and shouted orders for all the world like an officer drilling recruits at a barracks training ground. Aritoma did exactly what he was directed to do, when he was directed to do it, and the way he was directed to do it.

Japan's industrialists do not want to waste so much as one movement in one man's arms. They call themselves super-efficient. In the direction of labor, like everything else they do, they try to get every possible ounce for their money. Japan's whole industrial life is built around this one idea—to get the most from each human cog. It is part of that idea to pay the human cog the absolute minimum on which he can subsist, and to keep him going by doping him with propaganda—the divine mission, the glory in sacrificing for *Dai Nippon* and the Emperor, and the super-race myth.

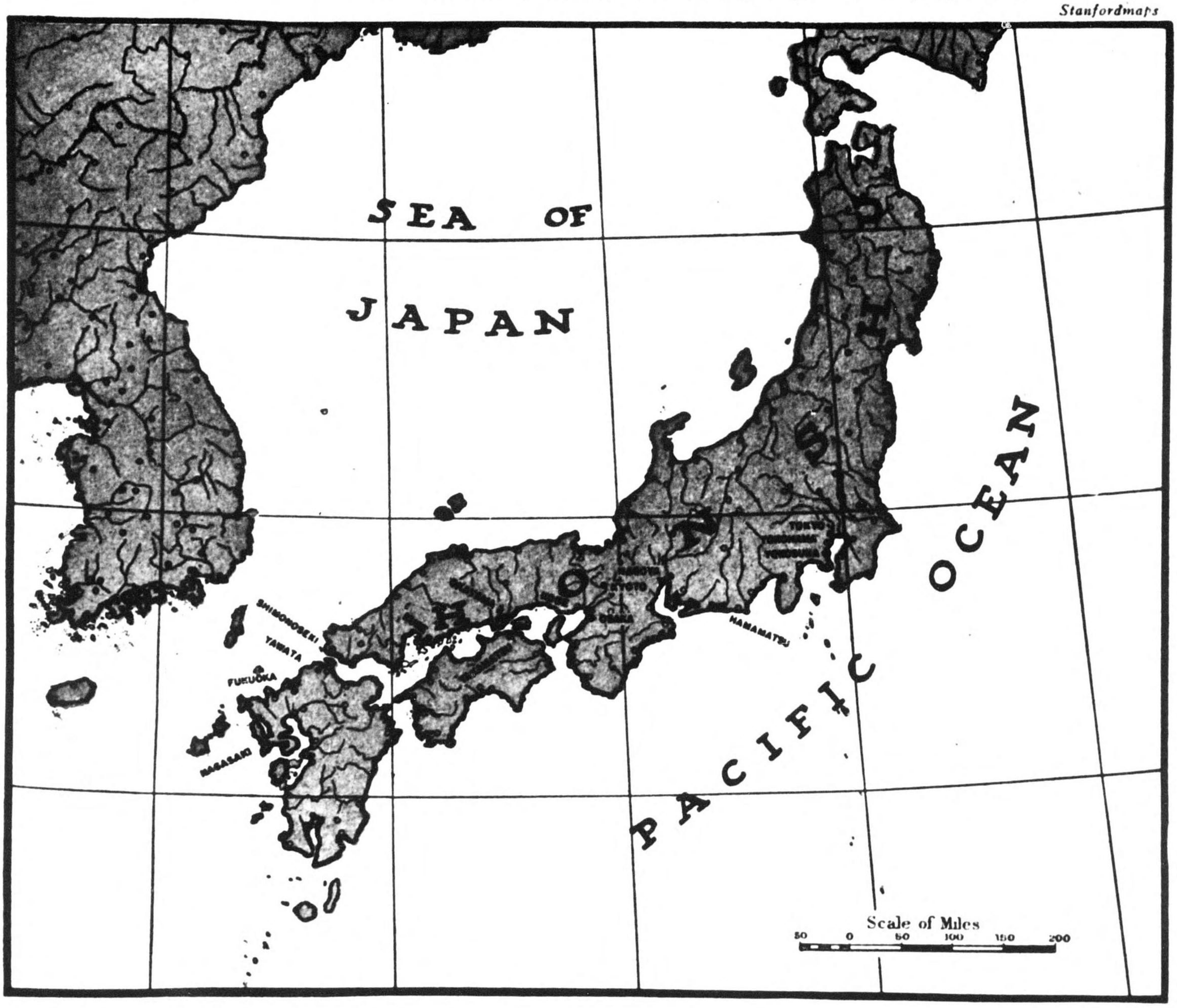
This idea of squeezing the maximum from the absolute minimum of everything extends to the material in her aircraft, just as it would apply to a one-acre farm that must be forced to produce as much as we would expect from ten acres. Japan seeks to attain a maximum of victory on a minimum of aircraft. In July, 1943, Japan's aircraft production was 1275 planes, 73% of which were combat planes. In May of this year our own output of planes was 8902. For 1944 we are scheduled to build 110,000 aircraft. Japan's present maximum cannot exceed 17,000 planes. In Japan's aircraft is her defeat. In total war, victory goes to the nation with the greatest production lines.

Japan finds herself in the predicament of needing a period of peace in which to expand her industry. But when she needs peace she has war—she rides a tiger. The old Chinese proverb says, "He who rides a tiger cannot dismount." Japan has taken up the sword and cannot sheath it.

Japan's totalitarian methods of commandeering industry may look efficient, but these methods are not efficient in

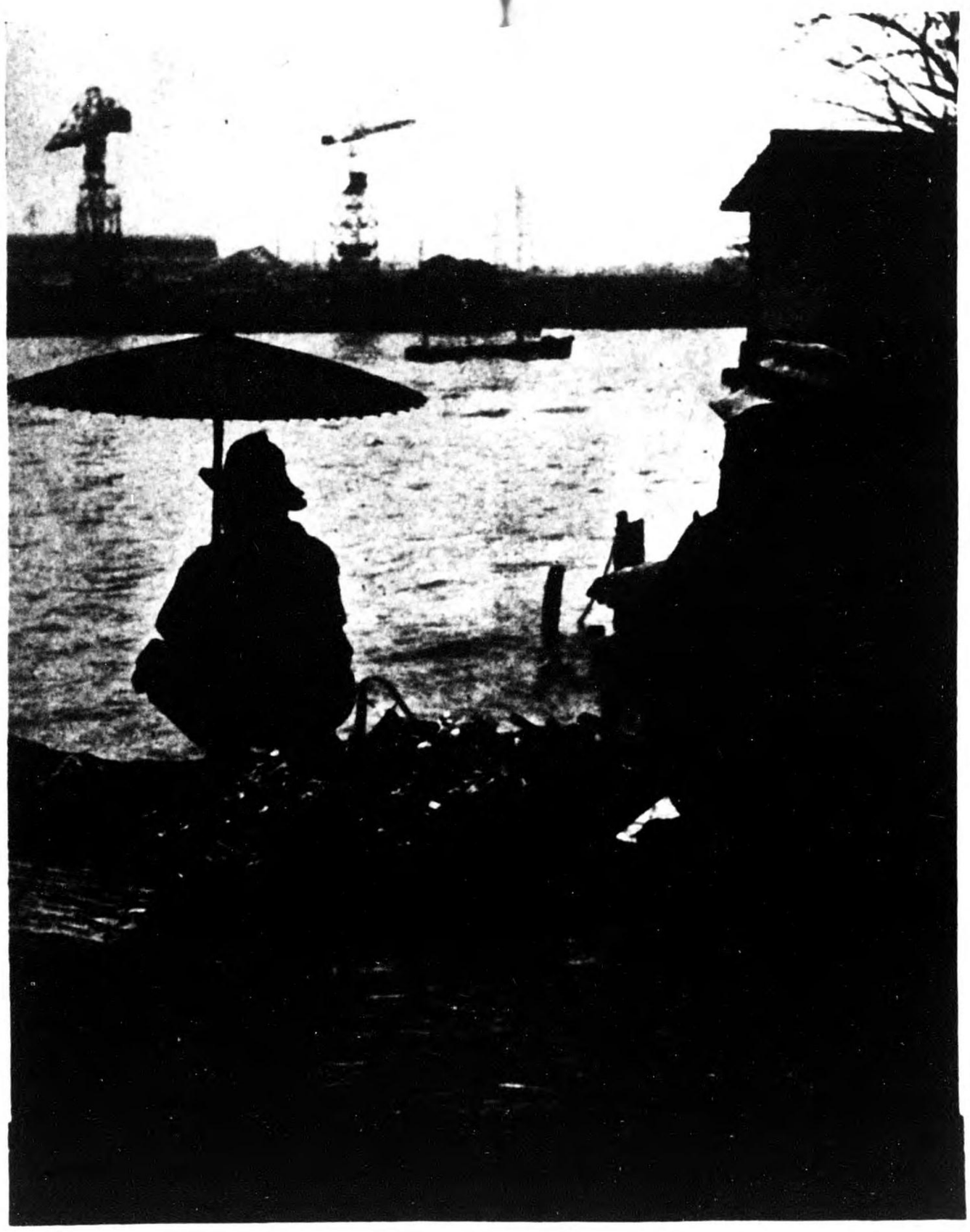
Most of Japan's industries are concentrated in the area, about 550 miles long, between Tokyo and Yawata

Stanfordmaps



comparison with our own. A human being cannot be efficient and work 16 hours a day, seven days a week, with only two days off in a whole month. The tempo of all labor is extremely slow.

In Japan every workman is made to feel by endless indoctrination that he as an individual is nothing at all, a mere blade of grass under the mighty wheels of *Dai Nippon's* colossal war machine, and that all he does is for the glory and the honor of Great Japan and her divine mission. When Aritoma began work for Mitsubishi he drank a cup of wine said to contain a drop of his employer's blood, that his loyalty might be a blood loyalty, and that he might remain steadfast. Thus we see the feudal spirit of centuries ago still holding over in twentieth-century industry in Japan. The laborer, like the much-glorified samurai, must drink of his master's blood, and thus in honor bind himself to remain loyal under all circumstances and conditions.



Many Korean Workers

Only 15% of Aritoma's fellow workers in his department were adult Japanese. Thirty percent were Korean and Chinese who had been brought there by the military and forced to work for Japan's glorious destiny. The remaining 55% were women and youths, both young men and young women. The young men were either disqualified for service in the Army or Navy, or were too young. In some of the departments half of the workers were women between the ages of 15 and 70. Last year the geisha was forced to lay aside her sunburst of kimono and obi, take down her mountainous coiffure and go to work in aircraft industries.

Buddhist priests were divested of their robes and put to work, too. All single women in Japan are forced to register for labor conscription. They may be forced to go anywhere, cannot leave their job, and are paid what the government wants to pay them.

In Nagoya everybody is desperately concerned about something to eat. Beef, pork, all canned goods, including milk; butter, bread, coffee, cheese, and a long list of other items have long since disappeared from the market. You simply cannot find them for sale.

Aritoma and his wife are permitted only eight pounds (seven sheng) of rice per month. They cannot make out on it. Sixteen to twenty pounds a month are the very least a Japanese laborer can live on and have a fair sufficiency. Rice is the staff of life to a Japanese. When he eats all the rice he wants he eats a pound of polished rice a day. Part of his present rationing of rice is not polished. This upsets his digestion which cannot take unpolished rice. As our Japanese laborer sees it, there is no substitute for rice, just as our American laborer sees no substitute for bread and meat. Soya bean curd, another must on a Japanese menu, is rationed so very low that it has just about ceased to be at all—a few ounces only a month. Fruit may be had only if a physician issues an order, which means that Aritoma and his family get none at all unless one of them is seriously sick. Aritoma and his family could buy just one dozen eggs a month.

Fish, eels, and baby octopus, essential foods to the Japanese, were not rationed so closely but were very hard to buy. There is a great shortage of fishermen. In normal times, 1,500,000 Japanese live by fishing and they haul in close to 50% of what the Japanese people eat. Now there is a great shortage of fishermen and much of their haul is dried and shipped to Japan's fighting men scattered over thousands of miles of battle front. Housewives stand in line for hours to buy one small fish for a whole family.

Sweet potatoes, the beloved *daikon* (pickled radish), and the eight-headed potato (*yatsugashira*) cannot be found in sufficient quantities to satisfy hunger. Seaweed was about the only thing last summer that could be had in sufficient quantities. Aritoma's children suffer most. They are pencil-legged and scabby from malnutrition. Aritoma's wages are at subsistence level. He never has enough to balance the family budget and therefore can accumulate no savings whatsoever.

What does Aritoma wear? Neither cotton, woolen, nor silk goods are for sale in Japan today. When Japan went to war with us one of her great sources of raw cotton was cut off. The Japanese have a substitute for cotton, wool and silk. It is made of wood pulp and soya bean stalks, but it is no good for either wear or warmth. *Tabi* (cloven-toed socks) made from it last but two or three days. Aritoma has quit wearing any at all.

The propagandists have tried to console Aritoma, however, with grandiose

promises of wool from Australia, cotton from our own Dixie at prices within his means. So he endures the frightfully sorry cloth, and dreams of soft woolens from Sydney and lustrous cotton goods from New Orleans, in 1944 or 1945!

Japan's greatest weakness is a shortage of ships with which to transport her raw materials from her far-flung occupied regions. It is farther from Nagoya to Rangoon than from Charleston to Naples.

Shortage of labor is the second great weakness in *Dai Nippon's* aircraft industry. In taking up the sword for empire building, Japan robbed her industries of labor, and now utilizes her starving children.

Aircraft Industries Compared

Even a casual study of Japan's aircraft industries will reveal a fatal truth which has lost for Japan control of the skies on many fronts, namely, her inability to expand sufficiently to compete with us in aircraft production. For example, the poundage of our aircraft production for 1944 will be 60% greater than it was in 1943. Japan can show no figures remotely comparable to these.

According to a recent release from the OWI on the status of the war in the Pacific, Japan's present output of planes of all types is estimated at between 1200 and 1500 a month.

Japan's current wartime consumption of oil products is estimated at about 55,000,000 barrels a year. Her production is placed at 3,000,000 barrels a year of natural crude, in Japan proper and Korea; and between 15,000,000 and 22,500,000 barrels of synthetics from plants in Japan, Korea and Manchuria.

Since this production represents only a third to half of her annual requirements, and since the refining capacity of the inner zone is only about 12,000,000 barrels, it is obvious she must rely on refining facilities situated outside of Japan proper and Formosa, particularly those in the East Indies. Thus she is predominantly dependent for defense on what has been stockpiled in the home islands.

Her stockpile of aviation gasoline is estimated to be equal to two years of warfare at the present rate of operations, since it totals about 75,000,000 barrels. Her lubricating oils are calculated to last 18 months.

Everybody is curious to know what the Japanese in Japan now think about the war. They think only that the Imperial Army will be completely victorious. They are taught and made to think this. For many years they have been doped with propaganda to the effect that the arms of *Dai Nippon* always win. The legions of the Emperor are invincible! The divine *Tenno* (Heavenly King) leads the army. It is the sacred sword of the Sun Goddess, *Amaterasu*, that makes the army invincible.

To think otherwise than he is told to think about victory would land Aritoma in a barbarous Jap jail, and subject him to merciless beatings by the police. Hundreds of native Japanese are dying in jails now, awaiting trials that perhaps will never come, for thinking differently than the propagandists directed them to think through their *tonari gumi* (neighborhood associations).

The people in Nagoya, or anywhere else in Japan, have no idea whatsoever how the war is going. They cannot have. It is a major crime to listen to a broadcast in English. Newspapers, magazines, books, broadcasts, personal correspondence with soldiers at the front, and public and private speech, all are under most rigid control of the metropolitan police, the special secret police of the Army and Navy, and the gendarmerie.

None of the aircraft workers knew anything about Japan's irreparable losses. Aritoma knew nothing about Japan's sea supremacy being smashed at Midway, when so many of Yamamoto's fleet were sent to the bottom or driven back to their home waters. He knew nothing about the true importance of this battle. He really thinks Japan controls the seas, and that she will always hold all the vast regions she has overrun.

Acme

Boeing "Superfortresses" taxi to the end of the runway on an airfield in China at start of a raid on Japan's mainland

Government Aids Migration

After the war he expects to migrate to Celebes. Hundreds in Nagoya have been permitted to move to Burma, Java, Malaya, China, the Philippines, and elsewhere in Jap-occupied countries, or as they say in Nagoya, the "colonies."

The government pours out a steady stream of lying propaganda in glowing praise of her "colonies." Schools for teaching the new languages are popping up everywhere in Nagoya just as they are in Tokyo. The "colonies" are pictured as being next door to heaven. Nurses, doctors, aircraft engineers, civil engineers, business administrators, agriculturists, contractors, and scores of others are being sent to the "colonies." Tojo announced that 40,000 had been sent out up to last summer.

Aritoma has heard time out of num-

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Industrial areas in Japan are congested, and living conditions are often primitive

Three Lions

GAS TURBINE

(*Continued from page* 232)

pressor would be small as they operate at high pressure.

This cycle is internally fired, the products of combustion passing through the gas turbines and main compressor. Enough make-up air is continually supplied to maintain pressure and support combustion. It is supplied by a compressor which is driven by a second gas turbine. This cycle avoids the large gas heater required by the Escher Wyss cycle; but requires an extra gas turbine and compressor to pump-up the system. Solid matter from the fuel must be removed.

In the closed cycles shown in figs. 8 and 9, reheating and intercooling are not illustrated. However, they offer the same advantage in the closed cycle that they offer in the open cycle. The biggest single additional problem in the closed cycle is a method of building practical heat exchangers. The problem is further complicated by the fact that the gases will carry foreign matter from combustion which may both corrode and erode the exchanger and reduce the heat transfer by depositing foreign material on the transfer surface.

Combustion Gas Turbine Control

Combustion gas turbine control can be simple and reliable, consisting only of control of the gas temperature by controlling the rate of fuel supply. Governing valves, such as used in steam turbine control, are not needed. Efficient partial load performance can be obtained by using two turbines: one variable speed turbine driving a compressor; plus a constant speed turbine driving a generator (fig. 10).

The use of regenerators, reheaters, and intercoolers, in addition to improving the full load economy, have an even greater effect in improving the partial load economy. In the closed cycle, by reducing the gas pressure as the load is reduced, practically full load efficiency can be maintained at partial loads.

The small, lightweight gas turbine appears to have a bright future in aviation because of the tendency toward power requirements beyond the practical maximum for piston engines. For relatively small power outputs, such as required by the airplane industry, the gas turbine, operating at high speed and high temperature to obtain maximum rating per unit weight of material has real possibilities. Much work has been done burning both gasoline and kerosene. It could be applied in jet propulsion, as a booster for a piston engine or as a propeller drive either geared or electric.

Other practical applications include locomotives, marine vessels, central power stations and processing in the industrial field where both power and process steam are required.

Metallurgy Plays an Important Part

In conclusion, it should be remembered that the cycle has only had practical application in very special cases. The full possibilities of any cycle can only be evaluated from successful proof of its economy, first cost, maintenance cost and reliability. The addition of elements which improve the fuel economy, and arrangements of the cycle for large capacities, are obtained at a sacrifice in simplicity and at a price. The development of the best system is expected to be costly in time and money.

Metallurgy plays an important part in the gas cycle as the efficiency increases rapidly with increase in top temperature. To obtain materials suitable for operation at higher temperature, the metallurgists are looking at materials similar to the non-forgeable and non-machineable tool steels. The method of forming these alloys to shape, such as precision casting to size, may revolutionize accepted methods of manufacture.

To apply such materials their additional first cost and manufacturing cost must be justified. Any application of such materials must be preceded by careful tests. For heavy duty apparatus these tests must extend over long periods before the designer can use them with safety. Careful differentiation between applications as to required length of life of apparatus is necessary. The fact that a piece of equipment is operated at 1800°F for a life of a few hours does not mean temperature of that order can be used for heavy-duty applications.

Present developments of the gas turbine are limited to the use of relatively high-grade fuel oils. This one factor is a serious handicap to the gas cycle. There is considerable evidence that oil is being used at a greater rate than new supplies are being found. So, in the post-war period necessity may dictate a prime mover which can use coal as a fuel. The gas cycle is definitely limited in application until such time as the problems in connection with the burning of low-grade oil and coal are successfully solved.

It will be wise to watch the developments of the early installations before attempting to make widespread applications. At present, conclusions as to the ultimate possibilities of the gas cycle are little more than good guesses. The gas turbine art must advance beyond its present early development stages, before it can be judged with assurance. However, undoubtedly it will find real usefulness in a large number of fields, possibly complementing rather than competing with the steam turbine. Just how and where the gas turbine will be applied, only time will tell.

JAPS BECKON BOMBERS

(*Continued from page* 54)

ber that the Americans in these regions, especially in the Philippines, are "decadent" and "spineless from liquor, women, and luxury." He does not quite understand all this, however. He has seen very few Americans, and those that he has seen have been very decent people. He cannot quite understand the vile talk poured out over the public radio concerning the Americans.

Destroying Nagoya will not be easy, But it will have to come. The Japs have studied its defense from every possible angle. But when the time comes it will be big industry vs little industry, and the size will be with us. Its destruction for the most part will have to come from the air, just as the German industrial cities were destroyed from the air.

The loss of Nagoya will cripple Japan's air power beyond repair. When the necessary bases are established, Japan's other industries can be pounded from the sea and from the air. Only three of Japan's cities of over 100,000 population are out of range of 16-inch naval guns. Forty-two of her cities of over 100,000 are within range of the big guns of the fleet. No part of Japan is more than 75 miles from the sea.

(*Continued on page* 236)

JAPS BECKON BOMBERS

(*Continued from page* 234)

Air distances are not measured in hours but in minutes. Once our bases are established, Japan will be easier to bomb than is Germany.

By the end of this year we will have several-fold superiority over Japan by air and two-fold by sea. The late Secretary Knox said not long before his death that we had 900 warships in our Navy and 80 of them were carriers. A war of movement against Japan's industrial centers will be possible because of our superiority in ships, planes, and in men.

WASHINGTON

(*Continued from page* 67)

cific area must be flexible. It will be particularly necessary to keep our plans in a fluid state until the results of the current Japanese drive in China can be measured. The United States will continue to play the main role as far as the use of its navy and air force is concerned. It will also supply the bulk of the munitions and military equipment.

What becomes the big question mark is the extent to which our allies can supply ground forces and bases from which more effective attacks can be launched—air bases in Siberia, for example. One thing that appears to be certain is that there will be no overall commander for the Pacific war. The area is too vast for such power to be concentrated in any single military or naval figure.

Whittled down in scope, the reconversion and surplus property disposal bills that were finally passed are not regarded as the final answer. On the other hand, there is much merit in the position taken by many Congressmen that it is better to approach such important subjects gradually instead of trying to nail everything down at once.

Future developments may make it necessary to alter policies considerably. For example, no one knows at this time how quickly war workers can shift back to other jobs. If the program moves smoothly and civilian production is resumed without any serious lags, there won't be any great need for unemployment insurance payments or for moving workers from one section to another at Government expense.

But if there are hitches, Congress can take another crack at the legislation. As a matter of fact, the reconversion bill approved does provide for Federal aid in bolstering up state unemployment insurance systems. But Congress adamantly refused to go for transportation allowances to displaced war workers. This is one of the matters it can take care of later. In the main, the bill adopted creates an office of war mobilization with overall authority to coordinate reconversion programs.

Much criticism has been leveled against the surplus property bill because of the final compromise vesting authority in a three-man board. The House held out until the last for a single administrator, on the ground that disposal could be handled in a more businesslike manner under such an approach. This view seemed to be concurred in by the Army and Navy. In fact, there were reports that the armed services had asked the President to veto the bill that finally emerged.

Meanwhile, Surplus Property Administrator Clayton who now holds the job under executive order has made it plain that he regards the new plan as entirely unworkable and that he intends to quit. He feels that a board would be slow in making decisions and would be apt to place undue emphasis on political factors. He also is disturbed about provisions of the measure restricting the free sale of certain types of surplus property.

The great bulk of the liquidation would be left to the owning agencies. They would be subject to price policies adopted by the board, however, and to certain other restrictions. But there is a way of skirting the law—a way that the Army has apparently discovered already. Under this evasion method, the owning agency merely refrains from declaring some of its property to be surplus. The bill attempts to guard against this practice by requiring the board to report to Congress any cases where the agencies seem to have a lot of property that they have not declared surplus.

From Bombers to Planes

On the basis of reports from reliable sources, it would appear that the aviation industry can stop worrying about the gigantic Willow Run plant as a possible post-war threat. It has been disclosed that Ford intends to acquire this plant to produce a new type self-propelled plow.

As the story goes, this plow can be turned out very cheaply at the big plant and will bid fair to revolutionize farming. Thus it is plain that Ford does not contemplate retention of the plant for aircraft production.

For its part, the Army has indicated that it would rather expand aircraft manufacturing of types necessary for the Pacific war at some other location than Detroit—the Dallas area, for example. One reason for this is that manpower is less tight in the Southwest. Also it is pointed out that to make new types of planes at Willow Run, new equipment would have to be installed.

After an 11,500-mile aerial inspection trip of Alaska and the West Coast, the special aviation subcommittee of the House Interstate Commerce Committee has filed a report that looks suspiciously like a new attempt to resurrect the infamous Lea bill. The subcommittee has concluded that since Congress did not pass the Lea bill it should at least accept legislation that would accomplish certain things that the bill

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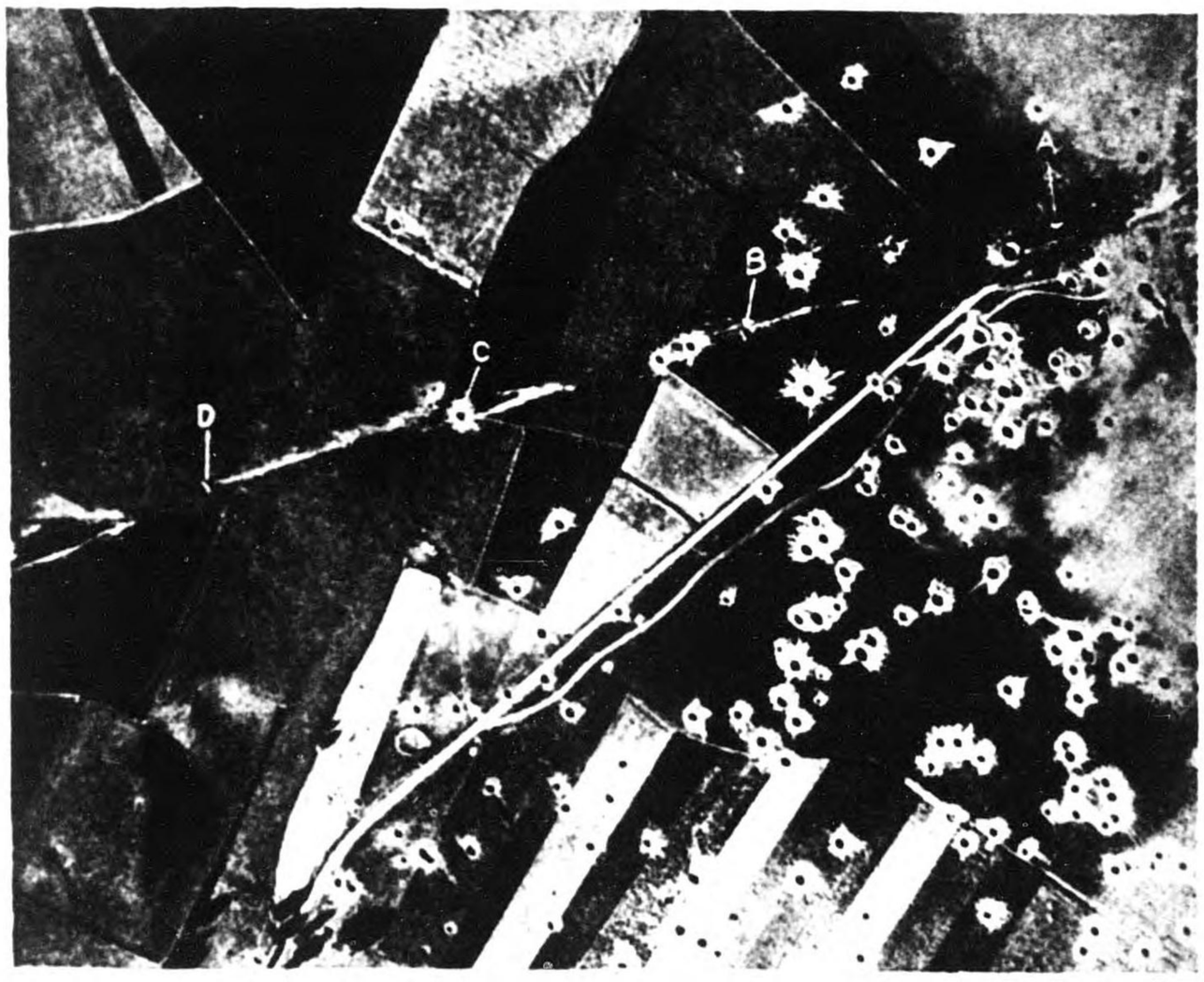

Acme

German robot flying bomb launching platform at A after attack by Allied aircraft. Craters of flying bombs which dropped prematurely shown at B, C and D