

# JAPAN

By RAY CROMLEY, '33

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Japan's economic strength lies in Japan's ability to regiment every man and woman, every scrap of metal, every machine and every grain of rice for the use of the army and navy. Japan is fighting a total war. Men, women, children, food, ships, schools, factories and farms are pawns, valuable only as they aid in producing battlefield victories.

Japan, because of the war, is willing to sacrifice the health of its women in coal mines. These women work only in the worst mines, in the small seams too narrow for men. The country is sacrificing its peacetime industry for the production of munitions, the health of its children in order to switch more crop areas from vegetables to the production of potatoes for industrial alcohol. Today's food is cut to a starvation level in order to store it against a future blockade.

This may seem brutal. This may seem that Japan is ruining its future citizenry. But it makes Japan terrifically strong militarily now.

Japan's war-time industrial strength lies in the close cooperation between industry and the military. Economic regimentation of Japan was easily accomplished because industry and commerce already was tied up in the hands of less than a dozen major family companies. Efficiently organized, these concerns were able to switch the whole of Japan's production from peace to war in a few years. Their power made possible a nearly airtight control of production, of the use of raw materials, of the use of food and labor and of the use of factories—so that nothing would be wasted on peacetime effort.

Their businessmen have kept up with the latest in industrial and munitions methods throughout the world. The military and industrial leaders, in close teamwork, have worked out methods for using the latest industrial methods for improving military technique. The military has thus been able to utilize the great resources and the brains of Japan's up-to-date private industry.

Japanese industry went further. Japanese ships were built so that they might rapidly be converted into troopships. When the army bogged down in China, the great commercial House of Mitsui stepped in and solved the army's supply problem almost overnight. Mitsui and Mitsubishi advisors were at the right hand of the army and the navy on the advance south to the Dutch East Indies. They had the responsibility of securing for the military the resources and the food of the newly-conquered areas.

Japanese may not be inventive, but because of Japan's bright businessmen and their world-wide commercial interests, the Japanese have not had to be inventive or original. They have had the pick of the world's inventions to use as their own. They have had their choice of the world's engineers. They have traded silk and tea and cotton textiles for airplane patents and industrial and military coaching.

Japan is strong, industrially speaking, because it has been willing to do things the inefficient way. Japanese industry has

sacrificed huge profits in past years in order to perfect a self-sufficient war machine that could not be blockaded out of existence.

Japan has not wasted precious machinery and metal if a job could be done by cheap—though inefficient—labor. Japan has sacrificed billions of yen in Manchukuo, building up an inefficient war industry, and other billions in Japan establishing uneconomical war production methods and wasteful substitutes. Iron ore could be bought in the Philippines for less than the Japanese paid in Manchukuo. Staple fiber costs more than cotton and lasts less than half as long. Alcohol is much more expensive than gasoline, but the Japanese pushed alcohol output with all their might. Japanese drove production costs so high that American machinery, produced with highly-paid American labor, cost less than Japanese machinery produced with cheap labor. Japan perfected substitutes that had only the value that they could be produced in Japan. Oil was manufactured from coal at exorbitant cost. Factories were made out of wood. Automobiles were run on charcoal. Whaleskin was used for shoes. *But these same inefficient devices make Japan able to withstand blockade and carry on an aggressive war.*

Japan's war industry is strong despite Japan's comparatively weak over-all production because, cancer-like, the war industry has grown as the expense of the peace-time industry. While Americans were perfecting commercial planes, the Japanese were building war planes which were combinations of the best features of American and European planes produced with the aid of American and European patents. Instead of building automobiles, Japan was building trucks and tanks. Instead of building schools, Japan was setting up training workshops, preparing men for work in the war industries. Japan's war industry is thus new and comparatively efficient, though Japan has never sacrificed output for the sake of efficiency.

All the funds that could be spared during the past few years in Japan have been spent for the importation of raw materials and essential machinery which Japanese mines and Japanese engineers could not produce at home. This has gone into Tokyo's enormous stockpiles. Japan has imported so far in advance and has so channeled its use of essential raw materials and machines to the war industries, that it may be possible for Japan to go on building up its war industry for some time to come. Iron and copper and lead and zinc have not been "wasted" on peacetime factories or jobs. They have all gone to war.

Labor has also been regimented for the utmost effect in war production. Japan's manpower has been thoroughly classified, with every man and woman's vocational, educational and health qualifications listed. Japanese men and women, like Japanese soldiers, can be ordered to war industry or other essential work. I have seen these reports. They are detailed and complete. They make it possible to use Japanese labor to the last man. To take

the places of men called up to the front and to industry, I have seen children of perhaps twelve to fifteen years of age working on the railways—taking tickets, fixing the roadbeds. To supplement Japanese labor, Korean and possibly Chinese labor has been brought in to work mines and farms. Japan is determined not to be caught short of workmen.

Japan's industry prepared for the southward move. Plantation mine and industrial overseers, foremen and skilled workmen, were trained in pilot plants in the South Seas, and in training areas in Formosa, the Japanese mandated islands and Japan proper. Japanese businessmen built up close connections with southeastern Asiatic businessmen, gathered important data about key mines, agricultural production, ability of native labor and the "trustworthiness" of the local populations.

And finally, the army and navy, with the cooperation of industry, worked out a military campaign that would utilize Japan's economic strengths and not bear too heavily on its weaknesses. Japan's military strategy to date has reflected the necessity of reaching decisions without too great an expenditure of scarce raw materials, munitions and men. Japan seemingly does not feel ready to carry on a continental war of the Soviet-German type. Its shortages may prohibit this type of war, unless Japan's leaders grow less cautious.

Japan, by its military campaigns, has increased its economic strength enormously, with the oil, the bauxite and the rubber of the Dutch East Indies, the iron and copper ore of the Philippines, the iron ore and manganese and tin ore of Malaya, the lead and zinc and oil of Burma, the rice of Thailand and the

corn, rice and phosphates of Indo-China.


But if Japanese industry, by preparing for war, has made itself much stronger than had been supposed, it nevertheless is left with basic weaknesses. These weaknesses will, in the end, open the door for an Allied victory.

America's leading strength in a war with Japan is neither the stupendous amount of its raw materials nor its high industrial production. America's war economic strength lies rather in *democracy*.


Democracy in the schools and business has produced the questioning mind. Experimental laboratories in high schools, colleges and the huge research programs of private industry have built up a corps of trained men that Japan cannot match. In order to push through Japan's program of regimentation, the questioning mind has been discouraged. Schools have taught men to believe, rather than criticize. Industries have found it cheaper to buy their new ideas abroad. Japan realizes this mistake now, and is attempting frantically to build up research laboratories and train engineers. But Japan has waited too long. There are good engineers and excellent scientists in Japan. But there are all too few for Japan's needs.

I am convinced that this war will be won by new inventions, new improvements in old inventions, new techniques which take advantage of new instruments and new ways of using for now utilized for photographing and thus condensing for air-mailing the millions of letters which soldiers and sailors and their families will write in this war. This saves essential tons

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GOOD LIGHT PROTECTS EYES ● It is important that the welfare of everyone directly or indirectly engaged in war work be safeguarded. Good light is necessary to eyesight protection, and it reduces fatigue and eyestrain. Proper home lighting helps you rest and relax so that you go back to work more refreshed and cheerful. Make sure you have plenty of light in your home.



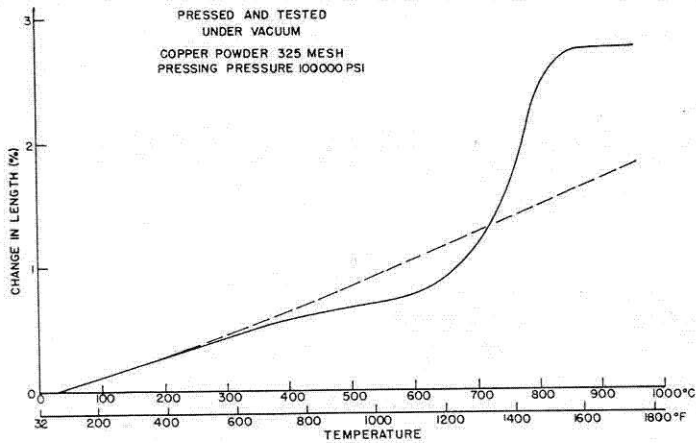


Fig. 2. Solid line indicates dilatation curves for copper powder pressed and heated in vacuo; dotted line indicates dilatation curve for solid bus bar copper.

Because dimensional changes are important, work has been conducted at the California Institute of Technology to determine the influence of pressing pressure, heating temperature, and powder particle size on the density and structure of copper powder. To obtain an accurate indication of change in length with temperature, a dilatometer was employed. Figure 2 shows the results of a test on copper powder of 325 mesh screen analysis pressed in vacuo at 100,000 pounds per square inch and then heated in vacuo. The dotted curve indicates the dilatation of forged, annealed bus bar copper. The expansion mentioned previously should be noted. Figure 3 shows the structure of the powder compact after heating. The well defined grains should be noted. Due to the voids present the specific gravity was 78 per cent that of bus bar copper.

Until these conditions are correlated and the changes in dimension can be controlled, the applications for powder metals will be restricted.

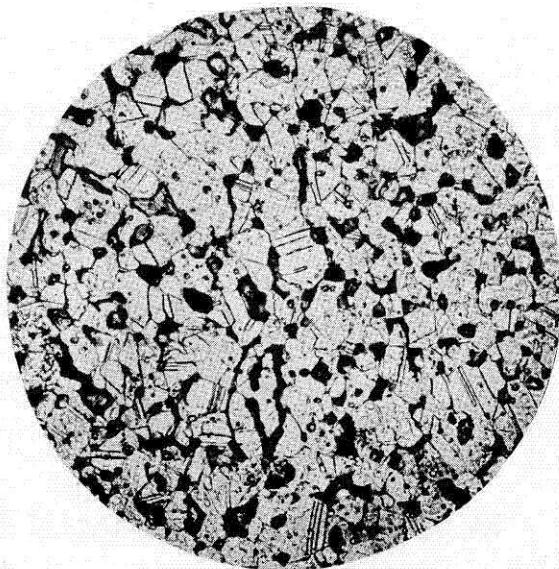


Fig. 3. Photomicrograph of copper specimen pressed at 100,000 P.S.I. in vacuo and heated to 950° C. in vacuo. 500 magnification.

## JAPAN

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of baggage space. American techniques have clipped hours off peacetime airplane wing assembly schedules, months off cargo boat production and added miles to airplane bombing ranges. American technique developed the dive-bomber, the torpedo plane and the submarine, which the Japanese have found so effective. Up to now, because in peace-time inventions are shared, this inventiveness of the Americans has done the Axis more good than it has the United Nations. But from now on this will not be so.

The winning of this war depends on America's using its inventiveness in daring ways to outsmart and confuse the Japanese.

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