

expanding aircraft and other factories, presents something of a bottleneck. Machine-tool makers cannot be trained overnight. A second problem likely to cause sleepless nights for executives is the supply of experienced aeronautical engineers. Technical colleges are producing a flood of engineering graduates, but an aeronautical engineer generally requires two or three years of experience before he can be regarded as a highly useful individual around a factory.

Some phases of aircraft work, such as production of high-powered in-line engines like the Allison, are so highly specialized that only the group now working in them can be considered competent to superintend expansion. They are already working overtime.

An Army Air Corps of between 350,000 and 400,000 men, including at least 35,000 pilots, would be required to man the Army's share of the 50,000 warplanes President Roosevelt proposes for national defense, it was estimated.

Navy Needs 15,000

Fifteen thousand or more pilots would be needed by the Navy. Approximately ten men are needed in the Army Air Corps for every plane.

The Air Corps' current strength is 28,000, including 2,000 regular and 1,000 reserve pilots. Just over 1,200 combat planes and 800 trainers are now actually on hand. Under last year's expansion schedule, Air Corps strength was expected to reach between 5,500 and 6,000 planes and 75,000 men by mid-1942.

Navy planes on hand are also just above the 2,000 mark. The Navy has upwards of 2,000 pilots. Just how many men in the Navy can be considered part of the marine equivalent to the Army Air Corps, however, is difficult to determine. Aircraft carrier crews perform both aviation and maritime work.

Sweeping reorganization of the Air Corps' already once-speeded-up training system will be necessary, if the President's program becomes law. Nine civilian schools employed to give Army men primary training, plus famed Kelly and Randolph Fields near San Antonio, Texas, are now grinding out pilots at a 2,400-a-year rate. A year ago, with only the two Texas schools in use, 800 pilots were graduated each year. Unlike Europe, where as many as half the military pilots are non-commissioned officers, all Army flyers are at least second lieutenants. The training course takes one year.

Army and Navy air forces, together

50,000 strong, would require the training of pilots at a rate approaching 10,000 a year, it is believed. Already aviation industry figures are speculating on the possibility of gearing the Civil Aeronautics Authority's private pilot training program to the expanded requirements of national defense. Seventeen thousand young men and women each year are receiving 50 hours of basic instruction, which is not, however, aimed at military flying. The C.A.A. program, launched on a full scale only last fall, is being conducted at colleges and universities throughout the country. Approved commercial flight instructors are the teach-

ers under a contract arrangement with the C.A.A.

No matter how much of the primary training is transferred away from Kelly and Randolph Fields, however, it appears that these two schools will have to give up their honored position as the only "universities" for advanced Army flying in the United States. European pilots on an average pile up many fewer flying hours in instruction and are put through the training mill in 5 or 6 months. Army comment is not available on this point, but it is doubtful whether the American training course will be similarly stepped up.

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RESOURCES

Nation Buys Ten Per Cent of Tin Stock Pile Requirements

Total Reserve Is Now 13,000,000 Pounds; Prize Tin Region of World Lies in East Indian Colonies

THE United States has purchased 6,724 tons of tin since last November to build up a reserve stock pile of this strategic material, it is shown by a survey of U. S. Treasury Department Procurement Division orders.

Despite the total of over 13,000,000 pounds at about 50 cents a pound—\$6,500,000—the reserve is believed to be only about a tenth of the total needed reserve of the nation. Army officials are reluctant to discuss exactly what tonnage of tin the nation would like to have for potential war reserves, but some years ago the National Resources Board fixed 60,000 tons as a minimum wartime reserve.

If, while England and the Netherlands are engaged in war in Europe, Japan should take over the Dutch East Indies and the British Straits Settlements in Malaya, the Land of the Rising Sun would at once control nearly half of the world's tin output.

Last year the Straits Settlements produced nearly 31% of all the virgin tin in the world while Netherlands India produced 17%. It is a significant comment on world production that the American purchases since November of last year have been virtually all from the Orient. Minor contracts have been awarded for Bolivian tin.

Bolivia produces 15% of the world output, not in the form of pure tin but

as tin concentrates which run from 70% to 80% tin content. This concentrate has to be further refined; an operation carried out mainly, in the past, in England and in the Netherlands. It is understood that two tin smelters are contemplated in the area of New York harbor to take over the smelting of Bolivian tin.

Tin has long been on the strategic minerals list of the United States, for American production has amounted to only about 90 tons a year, over a five-year average. The nation's requirements, on the other hand, run nearly 100,000 tons yearly, of which about 75,000 tons must be virgin metal. The remainder consists of secondary tin obtained from scrap which collects in tin can factories and from "junk" alloys which contain tin.

Prize tin region of the world, and what may attract Japanese eyes, is of course the East Indian colonies of England and the Netherlands. In this region the tin ore is cassiterite, or tin oxide, which runs as high as 78.6% tin. Mining is a simple operation by dredges, of which more than 100 are available. In addition anywhere from 50,000 to 100,000 Chinese laborers work at tin mining, according to the world demand.

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Potatoes are practically the only important plant food in which Great Britain has become self-sufficient.