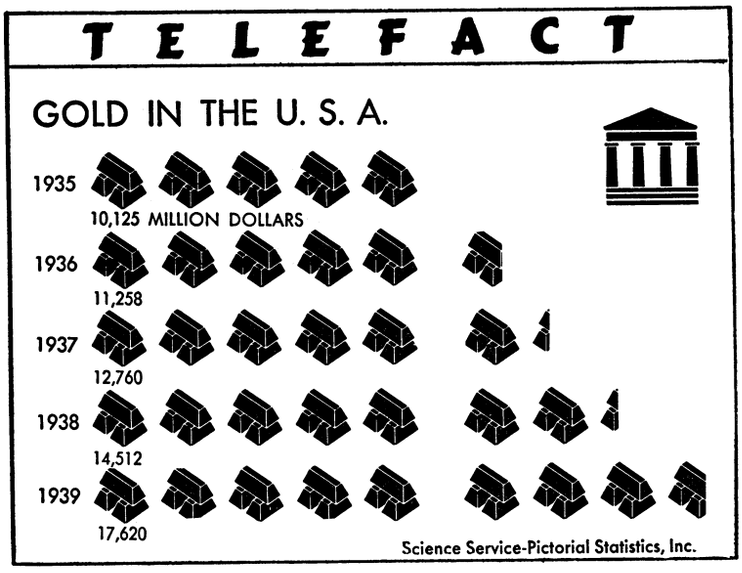

AERONAUTICS

Fifty Thousand Planes Will Probably Cost $5,000,000,000

Hundred Thousand Engines Needed for Fifty Thousand Planes and They Will Cost at Rate of $10 a Horsepower

FIFTY thousand Army and Navy planes, as called for by President Roosevelt, would cost the taxpayers perhaps five billion dollars or more for planes, engines and spares alone, authoritative aviation industry spokesmen told Science Service.

This sum, greater by far than the value of all American aircraft produced since the end of the first World War, does not include the cost of the expanded Army-Navy flying services to operate them or the gasoline they will consume or any other maintenance or operation expenses.

Though there is not even a reliable estimate of the current value of American aircraft factories, the colossal plant expansion called for by the President's proposed 50,000-a-year production rate will cost at least $300,000,000, part of which will undoubtedly be met by industry profits, these same sources believe.

Past plant expansion, which has come close to doubling floor space in both aircraft and power plant factories in the past two years, has been financed from earnings, loans by the Anglo-French Purchasing Board and premiums on equipment delivered to the Allies, as well as stock issues. Not all the $200,000,000 to be made available to the President—half appropriation of actual funds and half authorization to let contracts—will be available to the aircraft industry. Gun and munitions factories are considered by military and economic experts to be more in need of such funds. Outside the aviation field, there has been practically no munitions industry in the United States since 1918.

The 50,000 planes will cost in the neighborhood of $100,000 apiece including spare motors and parts, which is about the present average for military planes of the different types. A single-seat pursuit now runs to about $50,000, a twin-engined fighter like the Lockheed P-38 to very nearly $90,000 and a high performance twin-engined bomber to almost $150,000. Substantial per-plane savings will be possible under the contemplated program, but there is a better-than-even chance that these will be eaten up by the race for continually greater speed and armament.

One hundred thousand engines will be needed for every 50,000 planes produced. Thousand horsepower engines or larger today cost more than $10 per horsepower. Even with mass production, the price is not likely to be driven below this ten-dollar-level. A billion dollars of the five billion, therefore, would have to go for motors.

The 50,000-a-year program would require the tripling of floor space of aircraft factories, doubling the area of engine plants, multiplying today's 100,000 aircraft workers by three and operating all plants around the clock, a formal statement by Col. John H. Jouett, Aeronautical Chamber of Commerce president, pointed out.

May Take Three Years

Col. Jouett's office would not even hazard a guess as to how long it would take to boost the present 12,000 planes and 25,000 engines a year to the new goal. But others agreed that the industry would be doing remarkably well if it were able to achieve this within three years. Several basic changes in the structure of the industry will result.

First, the trend toward subcontracting will become far more widespread than it already is. A situation similar to that in Germany and England, where more than half the armies of mechanics working on aircraft production work outside the regular industry, may obtain.

Second, the bewildering variety of types now under production will be sharply reduced. Officials of the Douglas Aircraft Company of Santa Monica, Calif., currently producing nearly a dozen models, have stated, for example, that they could increase production by at least half if they were turning out half as many models. A Science Service correspondent has seen in confusion on the floor of the Douglas plant at the same time Douglas DC-3s (21-passenger airliners), B-18As for Canada (an obsolescent Army bomber), B-26s (new heavy twin-engined bomber), B-20s (375 mile-an-hour attack bomber) and others. Greater standardization may have been desirable before; it is compulsory now.

More complete tooling and a greater approach to straight-line production methods will result. Standardization will undoubtedly lead to construction of approved types under license in factories other than the ones where the designs originated. This system has been followed in Germany and England for some time. A start in this direction is to be made under an arrangement whereby the Consolidated Aircraft Corporation and the Boeing Aircraft Company are to produce Douglas B-20s for the Allies under license.

Several stiff obstacles will have to be hurdled if the 50,000-a-year program is to succeed. The machine tool industry, already working night and day to supply

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-commisioned 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 teachers 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.

Science News Letter, June 1, 1940

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.

Science News Letter, June 1, 1940

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