CONVEYOR-The power-driven overhead conveyor system is spelling mass production of U.S. warplanes. For details of the newest, fastest aid to aircraft output, see Cols. 3 and 4

INSTRUMENTS—Airplanes can't fly without instruments. Altimeters, tachometers, compasses, turn and bank indicators, scores of other aids to flying and navigation are coming from instrument makers in an unbroken flow. How is this being accomplished? See Cols. 4, 5, 6.

Vol. 3, No. 3

June 15, 1941

NEW YORK:

30 Rockefeller Plaza

LAUREN D. LYMAN

Vice-Chairman

United Aircraft

Corporation

T. C. SULLIVAN

Vultee Aircraft

AVIATION NEWS COMMITTEE

LOS ANGELES: 7046 Hollywood Blvd. A. M. ROCHLEN Chairman

Douglas Aircraft Company

F. R. NEELY Bell Aircraft Company

LEONARD K. SCHWARTZ Lockheed Aircraft

Plane Production

Rate Is Exceeded

Use of Big Bombers for

Convoys Told

(ANF)—The 18,000-a-year airplane

production rate scheduled by the

U. S. Government when it laid out

the first large defense program last

fall is already being exceeded by

the aircraft industry, Col. John H.

Jouett, president of the Aeronau-

tical Chamber of Commerce, de-

Col. Jouett pointed out that war-

plane production rose from 1000 in

January, 1941, to 1427 in April and

disclosed that similar increases

land with a fair chance of spot-

months increased plant space from

few months increase plant space

clared in a recent statement.

world powers, he added:

WASHINGTON, June 00 .-

WASHINGTON: Shoreham Bldg. HOWARD MINGOS Secretary

Aeronautical Chamber of Commerce H. E. LAWRENCE

AVERY McBEE Glenn L. Martin Company

Curtiss-Wright Corporation

HAROLD MANSFIELD Boeing Aircraft Company

AEROQUIZ

How Many Planes on Navy Carrier?

Q — How many airplanes are based aboard a U. S. Navy aircraft carrier?

A-The number depends on the size of the carrier. An average force consists of four squadrons of 18 planes each—one fighter, two scout-observation, one torpedo.

Q-How many workers will be eded to meet the requirements of the national defense and aid-to-Britain aircraft programs?

A-The Aeronautical Chamber of Commerce estimates that at peak production, the aircraft industry (exclusive of parts and accessories manufacturers) will employ a total of 505,781 workers.

were anticipated in months to **Aerial Transport** Outlining recent technical Must Be Developed achievements of the aircraft industry which made American war-That's Recommendation planes superior to those of all other of Export Group

"Our increased production of WASHINGTON, June 00 .four-engine long-range bombers port, private flying and export can help to solve the convoy probtrade must be emphasized to inlem. Sent out from bases on this sure continuance of a topflight side of the Atlantic they can carry aircraft manufacturing industry in enough heavy bombs to sink large the United States following the ships. They can patrol a zig-zag present defense emergency.

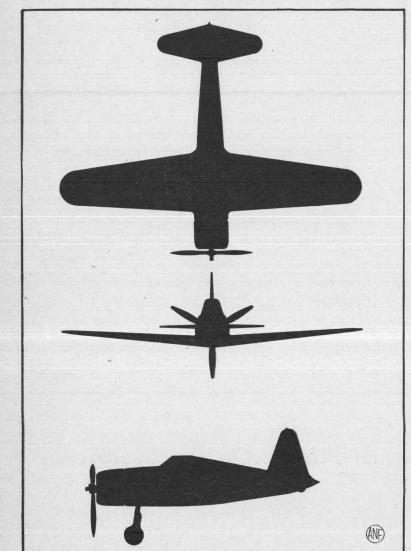
These were the conclusions reached by 70-odd delegates to the course over a convoy route, say 200 miles wide, all the way to Eng-Third Annual Aircraft Export Conference, sponsored by the ting and destroying raiders that might be lurking within striking Aeronautical Chamber of Comdistance of supply ships in a conmerce of America, which recently concluded a two-day session in Col. Jouett revealed the aircraft Washington.

industry, which in the last four Representatives of more than 50 aircraft manufacturing concerns 25,500,000 square feet to 32,800,000 attended the conference to discuss. square feet, will within the next among themselves and with government officials, means of atto more than 50,000,000 square feet. taining 100 per cent cooperation Employes in the same period will be increased from 237,000 to more on the part of the industry with the defense efforts of the United States and allied governments.

RELEASE JUNE 15

than half a million.

Know America's Planes VULTEE VANGUARD



Fast, heavily-armed fighter planes are being produced in evergrowing numbers by the American aircraft industry to meet the needs of the embattled British and our own air force. Here is a fine example of this type of aircraft—the Vultee Vanguard interceptor pursuit designated as the P-48. The Pratt & Whitney 1200-horsepower Twin Wasp gives the Vanguard a speed of 350 miles per hour, while six machine guns, two of them .50 caliber weapons, provide heavy fire power. Points of identification include the widely-spaced landing wheels (which are fully retractable), the long, sleek nose and the roomy cockpit housing, providing excellent visibility.

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Aviation News Features



Assembled and Released by the Aviation News Sub-Committee of the Public Relations Committee, Aeronautical Chamber of Commerce of America

Production of Planes Is Streamlined by New Powered Assembly Line

An Overhead Conveyor Speeds Building of U.S. Aircraft

VULTEE FIELD, Calif., June 00. —(ANF)—More than a mile of overhead conveyors, slashing final assembly time in half and required floor space by 33 per cent! That is the answer of one leading airplane manufacturer to the need for mass production, as the nation's aircraft industry gears for

a history-making output of war-Recently completed at the California factory of Vultee Aircraft, Inc., is what President Richard W. Millar describes as the first powered mechanized final assembly line in the industry, resulting in a

fourfold increase in production.

"COULDN'T BE DONE" "The problem of gearing parts production to final assembly and the split-second timing of operations, especially in view of changes in specifications during the course of a contract, has heretofore led industrial engineers to the conclusion that powered assembly lines could not readily be adapted to the aircraft industry," Mr. Millar

"However, Vultee, with the largest order ever placed in number of units for any one type of airplane, has been able to develop this new pcoduction system to a degree far

beyond expectations." Vultee's final assembly conveyor system involves a total of 6280 feet of overhead rail, the line being so designed that at every point there is a floor area free from machinery and obstructions, permitting complete access to the undercarriage of the plane.

FEEDER LINES Feeder lines reach out into various sub-assembly departments to carry completed major units of each plane into position for final

assembly. One such line extends into the tubular fuselage section. Another taps the heart of the center-section department. A third brings outer wings to their exact assembly station; still another feeds complete sections into the final line. During the course of their journey, the major sub-assemblies pass through two paint rooms-still on

spray painted. The actual final assembly line involves a total of 46 stations, at each of which a carefully planned by a crew which remains at the station. Operations have been arranged so that they are completed in a given period, at the end of which the plane automatically moves to the next station.

STOCK AT HAND During the fuselage assembly stage the plane is supported from a monorail conveyor, supplemented by a stabilizing outrigger. Along this line is a continuous stock of parts, divided into sections so that supplies in any particular area correspond with the nearest assembly station. Stock clerks continually replace parts in travs and

Powered sections of the conveyor system are chain driven and the speed is controllable according

to the output rate required. Back of the assembly lines are dozens of other departments, devoted to the numerous stages of fabrication, all of which must operate on split-second timing to insure the smooth flow of finished airplanes onto the flight ramp.

PLANE FACTS:

Inspectors Play Important Role

There is an inspector for every 13 production workers at the Farmingdale, N. Y., plant of the Republic Aviation Corp. Each of the speedy P-43 "Lancer" interceptor planes which the company is now turning out in quantities for the Army Air Corps gets more than 20,000 separate inspection operations.

In construction of the new "blackout" plant of Douglas Aircraft Co. at Long Beach, Calif., 3763 tons of structural steel were raised and riveted into place in 32 days' working time, an average of nearly 120 tons daily.

The weather is "made to order" at the Sperry Gyroscope Co. In the company's all weather laboratory it is possible to test aircraft instruments in temperatures ranging from 40 degrees below to 150 degrees above zero. Humidity, fresh and salt water fogs and sunshine also can be simulated.

The U.S. Air Corps will seek 800 to 1000 reserve officers annu-

NEW MILITARY MODEL The War department has conducted tests of a new basic trainer, the XBT-12 produced by Fleetwings, Inc., powered with a 450horsepower Pratt & Whitney radial engine. Facilities of the XBT-12 provide for a student and instructor in a canopied cockpit.

MOVING TRACK MEANS FASTER

PLANE OUTPUT Here, step by step, are the various phases in the creation of a military training airplane, as car-

assembly lines of Vultee Aircraft: 1-Main fuselage section goes on overhead rails, to receive wiring, controls, etc., at consecutive work stations.

2-Monocoque section and tail assembly meet on conveyor and are joined together, after passing through paint shop.

3-Center section rolls through paint shop, then gets landing wheels and shock absorber struts. 4—Power plant is assembled and mounted on engine balcony. 5—Fuselage, tail assembly and

center section meet on final assembly line and are quickly bolted together. 6—Conveyor brings engine down off balcony to final assembly line

7-Plane rolls along line, picking

up outer wings, propeller, accesso-

8-Completed plane passes through inspection and rolls out on flight ramp.

where it is attached to plane.

50 Acres for U.S.

Airplane Engines New Plant Is Dedicated at Cincinnati

CINCINNATI., O., June 00.—(ANF)—Reputedly the largest defense structure in America, the Wright Aeronautical Corp.'s sixth factory, which will manufacture one thousand 1700-horsepower engines a month for the nation's ever-growing warplane fleet, was dedicated at Cincinnati on June 12. The new factory covers 2,120,000

square feet, or approximately 50 acres. The task of erecting the building required 193 working days. Although the plant was formally opened only last week, it has been producing engine parts since last April, when "pilot" or temporary production lines were set up. A force of 2700 men, vanguard of an eventual 12,000 workers who will

man the plant, is now on duty. It

is expected that peak production Present at the dedicatory ceremonies were Guy W. Vaughan, president of the Curtiss-Wright Corp., and high-ranking officers of the Army, Navy and Washington defense groups. The Wright Aeronautical Corp., a division of Curtiss-Wright, is operating five other plants in or near Paterson,

BIG OCEAN HOPPER The new Boeing 314-type ocean clippers have a fuel capacity of 5400 gallons, sufficient to fly nonstop from New York to Lisbon and still have 1000 miles to spare.

Plane Industry's

10 Billion Dollars

U.S. and British Orders Already Exceed Five **Billion Mark**

The airplane manufacturers and allied industries, including most of he major motor car producers. have at the moment on their books rders amounting to an estimated \$5,152,000,000, consisting in the nain of business booked for the United States Army and Navy and Freat Britain.

BACKLOGS ROCKET At the close of 1938, the backlog stood at \$186,042,900; by the end of 1939 it had mounted to \$759,-378,000, and by midsummer of 1940 it totaled \$2,144,550,000. In January, 1941, it had risen to approximately \$3,500,000,000, excluive of certain automotive and supplier contracts, the Committee reported. And the monthly output of planes has swelled from around 600 at the middle of 1940 to an

estimated 1500 for June, 1941. In addition to the current expanon plans which have made such growth possible, new plants for plane, engine and propeller production, now under construction, will enter into the picture within the next six months. When all of these attain maximum monthly production, airplane output in the United States is expected to reach between 25,000 and 30,000 a year. Some defense officials predict, according to the Committee that this rate will be attained by Sep-

Leaders of the defense program are already formulating plans for supplementary orders of 22,000 to 26,000 airplanes—10,000 of them for Britain, 12,000 for United States defense and the 3600 bombers on which the automotive industry will collaborate with leading aircraft

With the huge plant expansion which is under way, the United States is actually in a position to attain the once undreamed of goal of 50,000 planes a year, the Com-

A TON OF TIRE The tires of the world's largest bomber, the B-19, weigh more than

Backlog May Hit

NEW YORK, June 00.—(ANF) backlog that may eventually soar close to the 10-billion-dollar mark! American aircraft producers are acing that possibility as they work 'around the clock" to meet orders already in excess of \$5,000,000,000 the Aviation News Committee reorted today.

ember, 1941.

41,000 AIRPLANES

The bulk of the industry's fivepillion-dollar backlog comprises wards already let for 41,000 aircraft—due for completion within the next 14 months. This total includes the 25,000 planes ordered by the U.S. Army and Navy and the 16,000 by Great Britain and allied democracies.

mittee pointed out.

A.M. RELEASE JUNE 16

MORE "MAN-HOURS" = MORE WARPLANES

41,000,000 MAN-HOURS FOR U.S. PLANES

APRIL'S INCREASE OVER MARCH IN "MAN-HOURS" WORKED TOTALED 2,448,054

EQUIVALENT TO

Each clock represents 100,000 "man-hours

Total "Man-Hours" worked in April were 41,776,032. Translated into completed airplanes, this index was the production equivalent of 400 heavy bombers or 1400 medium bombers.

Source: AVIATION NEWS COMMITTEE Aeronautical Chamber of Commerce of America

ONE HEAVY BOMBER REQUIRES

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Aviation's Who's Who

In 1909 a U. S. Navy midshipman named Donald W. Douglas happened to watch a flight of the Wright Brothers' flying machine. What young Douglas saw that day brought the world a pioneer

in the science of aerodynamics, a genius in foreseeing the nature and ial commerce, and a founder of an organization whose achievements were to write new pages in history. Born in Brooklyn, N. Y.,

in 1892, Don Douglas was 17 when he received his appointment to the U.S. Naval Academy at Donald Douglas Annapolis. Not

long after, he was among the few who watched the Wrights demonstrate their frail but famous little biplane at Fort Myer, Va. After three years of training

cruises, navigation and mathematics, young Douglas found his mind was still on wings and the skies instead of ships and the seas. Although his father, William E. Douglas, a New York banker, had hoped Donald would become a naval officer, he resigned in 1912 to enter the Massachusetts Institute of Technology.

Graduating in 1914, he immediately received his first job in aviation, an appointment at the insti-

DONALD W. DOUGLAS tution as assistant in aeronautical engineering. With Commander J. C. Hunsaker he worked on the first wind-tunnel, a step that laid the foundation for aviation's amazing development in the past quarter of a century.

In 1915 he joined the Connecticut Aircraft Co. in New Haven as a consultant, working there on the D-1, first dirigible to be built for the Navy. Soon afterwards, Mr. Douglas went to the Glenn L. Martin firm as chief engineer. For a time he served as chief designer for the aviation section of the Signal Corps, returning later to Martin.

By 1920, Donald Douglas was working for himself. He moved to Southern California, and with David R. Davis formed the organization that was the predecessor of Douglas Aircraft Co. Over a table in the rear of a barber shop he designed the Douglas "Cloudster." the miracle of its day. It was but a step from that trailto the company's first Navy contract, for several additional air-

planes. In four years came another milestone in the Douglas career. The "DWC" was finished, and with three of these world cruisers the United States Army made

its historic globe-circling flight. Mr. Douglas in 1932 carried his organization into a new field. Introduction of the series of "DC" transport airplanes brought to air travel new standards of safety, speed and comfort.

In 1936, President Roosevelt presented him the Collier Award for outstanding advances in aviation. In January, 1940, he received the Guggenheim Gold Medal for the outstanding contribution to the development of military and commercial airplanes.

Military aviation has seen the Douglas company become ever more important, with its present national defense expansion program scheduled to make the company the largest single factor in airplane production for America's Through the years Douglas en-

gineers and craftsmen have developed and constructed advanced military aircraft of all types, now turn out for the U.S. Army and Navy speedy and powerful medium bombers, attack ships, dive bombers and troop and cargo transports. Completed for the Army early this year was the 82-ton B-19 longrange bomber, largest and most formidable airplane ever built.

TOO FAST TO HEAR

At a recent demonstration in Los Angeles, the Lockheed YP-38, twin-engine pursuit interceptor airplane, flew across the municipal airport so swiftly that it disappeared into the horizon before the 50,000 spectators on the ground were able to hear the thunder of its motors.

April Index up 2,448,000 Over Previous Month

Increased Floor Space and Personnel Are

Also Reported A.M. RELEASE JUNE 16

WASHINGTON, June 16 .-(ANF)—An increase in April of nearly two-and-one-half-million "man-hours"—key to the evergrowing productive effort of America's aircraft industry—was reported today by Col. John H. Jouett, president of the Aeronautical Chamber of Commerce, to the Chamber's Aviation News Com-

mittee. "Man-hours" worked in airplane, engine and propeller plants throughout the nation in April totaled 41,776,032, as against 39,-327,978 in March, an increase of 2,448,054 "man-hours," the Cham-

ber's survey showed. Translated into completed bombers, for instance, this "man-hour" production index disclosed that the industry in April attained production equivalent to more than 400 heavy bombers or nearly 1400 medium bombers, the warplane types on which so much emphasis has been placed recently by the Administration and British offi-

(These figures were cited merely for purposes of illustration, since actual production figures in number of airplanes are military information released only by the Office of Production Management.)

ACCURATE INDEX "Man-hours," it was pointed out,

provide a much better barometer of production than number of units (planes), because completion of any given number of units would reflect all the way from 15,000 "man-hours" each for a pursuit ship to 100,000 "man-hours" each for a heavy bomber.

Though the "man-hour" index furnishes accurate indication of industry effort it does not necessarily indicate an increase in units produced in ratio to the increase the production schedules and plans of various aircraft companies, a high percentage of "man-hours may go into sub-assemblies, parts fabrications, etc., which will not be reflected in actual units produced until a later date.

MORE PLANT SPACE Equally indicative of the indus-

try's drive to arm America and the other democracies in the air was the fact that a total of 1,458,829 square feet of new plant space was brought into operation during April. This brought plant space in operation on May 1 to 34,245,180 square feet, leaving 19,039,924 square feet under construction.

During the same period the number of employes in the industry increased from 237,267 to 247,-047, boosting weekly payrolls from \$8,761,426 on April 1 to \$9,022,125 on May 1, a gain of more than \$260,000 a week in the 30-day

4 New Bomber Plants

To Cost \$63,000,000

WASHINGTON, June 00 .-(ANF)—Cost of four new bomber assembly plants being constructed in the South and Middle West will total \$63,000,000, the War Department disclosed recently in announcing appointment of William H. Rose as civilian head engineer in charge of construction.

Location, cost and other details on the four plants, all of which are scheduled to be in operation by the end of the year, follow: At Omaha, Neb. Cost, \$11,200,-

000. To be operated by Glenn L. Martin Co., with Chrysler Corp. furnishing parts. At Fort Worth, Tex. Cost, \$22,-400.000. To be operated by Con-

solidated Aircraft Corp., Ford Co., supplying parts. At Tulsa, Okla. Cost, \$22,000,000. To be operated by Douglas Aircraft Co., Ford Co. furnishing

At Kansas City, Mo. Cost, \$7,-400,000. To be operated by North American Aviation, Inc., with Gen-

eral Motors Co. supplying parts.

GLASS STOPS BULLETS!

Armor Plate Replaces Old Stovelids Tenth of a series illustrating the manner in which research and experimenta-tion are providing new methods and materials to improve the quality of military aircraft, the following article deals with the development of bullet-resistant glass and armor plating being used on our fighting planes.

Stovelids, car doors and other odds and ends of metal used by pilots as protection from gunfire in World War I have been replaced by special armor plating

engine, instruments, etc. Designers and engineers report that the combat aircraft now leaving the production lines of America's airplane plants are so constructed that little serious damage can be done to the structure by small-bore ammunition. Adequate, well-placed armor plating also protects the ship against hits by

large shells.

One effective means of protection is bullet-proof glass, according to the Aviation News Committee. In two-inch thicknesses, this glass will stop penetration of .30 caliber ball designed to protect the pilot, the ammunition at normal impacts. Glass three inches thick will stop .50 caliber bullets.

Armor in the pilot's compartment is designed to protect his head, back and seat, with bulletproof glass used to protect him from direct frontal fire. All equipment in the pilot's compartment is so placed as to provide as much protection as possible.

Instrument Makers on the Job for Defense Floor Space, Personnel Doubled to Meet

Emergency

NEW YORK, June 00.—(ANF)— Because of a planned, orderly expansion program set in motion months ago, manufacturers of aeronautical instruments are keeping pace with the terrific demand created by the national defense emergency, the Aviation News

Committee reported today. Instrument makers have doubled floor space and personnel, have added new shifts and have turned to widespread subcontracting to assure an unbroken flow of such delicate equipment as altimeters, artificial horizons, tachometers, direction finders, air speed indicators, radios, compasses, robot pilots, turn and bank indicators and

dozens of other devices. FIFTY INSTRUMENTS

These instruments are playing an increasingly important role in military, commercial and private flying. Ten years ago the average transport plane carried about 15 instruments, valued at from \$1,000 to \$2,000. Today, most of the big fellows, both military and commercial, must be equipped with 50 or more costly and complicated instruments of a total value of

\$15,000 or more. Planes' instrument panels are fast becoming more and more confusing to the eye of the layman. There is, for example, the gyro-pilot or "iron mike" which relieves the human pilots from the manual operation of the plane's controls; and the directional gyro and the gyro-horizon which give the pilot a direct and accurate picture of his course and the altitude of his plane even though he is flying in the overcast or on top of the clouds where there are

no visual reference points INCREASED PRODUCTION In 1928 the Sperry Gyroscope Co. of New York City was producing 60 instruments each month. Now they're turning them out at

Three of these leading manu-

the rate of 1250 a week.

vision of Bendix Aviation Corp. and the Kollsman Instrument Co. of Elmhurst, N. Y.—are utilizing a total of 1,345,000 square feet of manufacturing space in their plants, as against a total of but 850,000 square feet one year ago. In May, 1940, the three groups employed less than 5,000 persons.

facturers of "flight security"to more than 10,000. And all three Sperry, the Pioneer Instrument Difirms will have greatly increased both their personnel and their manufacturing space by next year after further expansion plans have been completed.

You are looking into the cockpit of an American bombing plane as

vorkmen install the dozens of instruments that will spell "flight security"

to pilot and crew. Multiply this scene several thousand times and you

will have some idea of the task confronting aeronautical instrument

makers who are working day and night to fulfill their part of the

growing defense program. The photograph, from the Aviation News

Committee, shows the nearly completed nose section of a Martin Mary-

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In addition to the man-power now employed, subcontractors are doing much work for the instrument firms. For Sperry, for example, they are now turning out Now that figure has been boosted 25,000 hours of work per month.