Aviation's Epochal Dates: Langley to Musick

Timely because of the transpacific air service established in November by Pan American Airways with their *China Clipper*, Lieutenant Colonel A. L. Sneed, department air officer, lists epochal events in the history of aviation.

December 8, 1903.—Dr. Samuel Pierpont Langley's effort to fly over the Potomac.*

December 17, 1903.—Wilbur and Orville Wright fly a motor-driven heavier-than-air craft at Kitty Hawk, North Carolina. July 1909.—The Wright airplane passes final acceptance test prescribed by the army. 1911.—First air-mail in the United States, Massau Boulevard drome to Mineola, points on Long Island.

September 17, 1911.—C. P. Rogers starts first transcontinental flight at New York City, reaches Pasadena November 5, lapsed time 59 days.

May 8 to 30, 1919.—Three navy *NC* flying boats set off from Rockaway, New York, May 8, for England under command of Lieutenant Commander A. C. Read. Flying via Halifax, Trepassey, the Azores, Lisbon, Commander Read reaches Plymouth, England, in his *NC-4*, May 30: the first U. S. to England flight.

June 14, 1919.—First nonstop transatlantic flight made by Captain Alcock and Lieutenant Brown, Britishers, Newfoundland to Ireland in 16 hours.—November-December.—England to Australia by Sir Ross Smith and Sir Keith Smith, Britishers; leaving London November 12, they fly 11,500 miles and reach Darwin December 10.

LIEUTENANT COLONEL A. L. SNEED

. . . as department air officer he courteously provided the data for this paper.

Colonel Sneed is West Point 1908 and continuously in the air corps since 1917 with command at various times of fields: Kelly, Crissy, Rockwell, Patterson, and Langley. He has been corps area officer of the 3rd corps; assistant military attaché for aviation in Turkey for a time, and at another time, on duty in the office of the air-corps chief and assistant secretary of war at Washington. He is a graduate of the Air Service Tactical School, the Air Service Engineering School, and the Command and General Staff School. He is rated airplane pilot and airplane observer and since December 1934 has been department air officer and the commanding officer of the 4th composite group.

1919.—Planes by day and trains by night, transcontinental airmail established: New York, Chicago, Omaha, Cheyenne, Salt Lake, San Francisco.

July 15 to October 19, 1920.—Captain St. Clair Street, U.S.A., commands a squadron of 4 *DH-4* army planes flying from New York to Alaska via Fargo, Saskatchewan, Whitehorse, Dawson, Canada-Fairbanks, Ruby, to Nome, and return to New York, flying a total of about 7,000 miles.

1923.—All-air transcontinental mail line established between New York and San Francisco.—O. K. Kelly and J. A. McCready of Mitchell Field, New York, to San Diego in total flying time of 26 hours 50 minutes.

June 23, 1924.—First transcontinental dawn-to-dusk flight; Lieutenant R. L. Maughan from Mitchell Field to Crissy Field, California, in 21 hours 48 minutes.

October 12 to 15, 1924.—Dr. Hugo Eckener flies the dirigible *ZR-3* (now the *Los Angeles*) nonstop Friedrichschafen, Germany, to Lakehurst, New Jersey, 5,066 miles in 81 hours 17 minutes, to deliver the dirigible to the United States.

1924.—Captain Lowell H. Smith commanding a squadron of 3 army Douglass planes effects the first round-the-world flight leaving Seattle April 6 and reaching Boston September 28 in a flight via Alaska, Russia, Japan, China, Malay Peninsula, India, Turkey, France, England, Iceland, Greenland, and the Atlantic to Nova Scotia and down to Boston—some 28,000 miles in 371 flying hours.

May 20 to 21.—Colonel Charles A. Lindbergh flies nonstop and solo 3,610 miles in 33¼ hours New York to Paris. June 4 to 5.—Clarence D. Chamberlain and Charles Levine, Americans, fly nonstop from New York to Eisleben, Germany 3,905 miles.

June 28 to 29, 1927.—Lieutenant L. J. Maitland and Lieutenant A. J. Hegenberger, U.S.A., flew nonstop from Oakland to Honolulu, distance 2,400 miles and time 25 hours.

June 17 to 18, 1928.—From Trepassey, Newfoundland, to Burry Port, Wales, W. Stultz and L. Gordon piloted Amelia Earhart, first woman to fly the Atlantic, in the *Friendship*.

October 11 to 15, 1928.—Dr. Hugo Eckener with the Graf Zeppelin made the first commercial dirigible transatlantic crossing from Friederichschafen to Lakehurst carrying 20 passengers.

January 1 to 7, 1929.—Five army officers in the *Question-mark* remained aloft by refueling in the air 150 hours 40 minutes, then a record of flying endurance.

July 4 to 11, 1930.—The Hunter brothers refueling in the air remained aloft 553 hours 41 minutes.

September 1 to 2, 1930.—Captain Coste and Maurice Bellonte of France made the first nonstop flight Paris to New York in 37 hours 19 minutes.

June 23 to July 1, 1931.—Wiley Post and Harold Gatty flew the globe in 8 days 15 hours 51 minutes. (Wiley Post solo surpassed this 2 years later, circling the world in lapsed time 7 days, 18 hours 49 minutes—aviation's most spectacular stunt, effected without parachute or liferaft).

Recent remarkable progress in aviation comes chiefly of the refinement of the engines. The first Wright engine weighed more than 12 pounds per horsepower, and engines have since been lightened to less than 2 pounds per horsepower by use of the new strong alloy metals through cooperation of engineers and oil companies. With ethyl gasoline compression ratios

(*Please turn to page 35*)

*Samuel Pierpont Langley was a Bostonian born in 1834, who died in Washington in 1906 three years after the Wright brothers proved his scientific theory correct, that man could fly in machines heavier than air propelled by power. Langley was a physicist and an astronomer, his chief work in physics, aside from researches in aviation, being on the infra-red rays of the spectrum. From 1887 until his death, he was the secretary of the Smithsonian; and it was down the Potomac 30 miles from Washington that he experimented with his aerodromes.

"In aeronautics," says the *Britannica*, "he succeeded in demonstrating the practicability of mechanical flight."

Before going to the Smithsonian, at the Allegheny observatory at Pittsburg, with a whirling table he studied the principles upon which flight depends, driving the revolving arm of his table by steam at speeds reaching 70 miles an hour—far above the minimum for flying with load. Then he undertook his aerodrome building, varying between steam, compressed air and carbonic acid gas for power, but unable, in 1903, to fly his machine because no practical launching apparatus had been devised. This was ready in 1894, and other handicaps were overcome in 1896, when a Langley machine flew over the Potomac 1½ minutes, or until its fuel and water were used up, when it dropped lightly into the river. It weighed 30 pounds, was 16 feet long, and its tip to tip wing spread was between 12 and 13 feet. Its 2 successful flights were made May 6, 1896; each was more than ½ mile long. In November 1896, another Langley aerodrome flew ¾ of a mile, reaching a speed of 30 miles an hour.

His aerodrome to carry a man was tried in 1903, 7 years after his successes of 1896, but failure with launching used up the funds at his disposal and the experiments had to be abandoned. When he died in 1906 he was 72 years old, the father of practical aviation, though his researches into the infra-red rays of the solar spectrum were his greater scientific contribution to applied knowledge.

Philippine Sales: Sales of Philippine sugar amounted to 15,000 long tons at prices ranging from 3.20 cents to 3.30 cents.

LOCAL MARKET: In sympathy with the New York market, the local market for export sugar was dull practically throughout the month, nominal quotations being ₱7.00 to ₱7.20 per picul, ex-godown, with a slight improvement noted in the latter part of the month as a result of the advance recorded in New York.

The market for domestic consumption sugar weakened during the month, sales having been effected at ₱8.00 per picul compared with ₱8.50 to ₱8.75 during the latter part of the previous month. Indications pointed to the balance of domestic consumption sugar available during December being much in excess of previous estimates, contrary to general expectations, with the result that prices gradually declined beginning the second week to the end of the fourth week, when some sugar were pressed for sale at ₱7.00 and ₱7.20 per picul. Owing, however, to the interpretation given to the ruling contained in Executive Order 899 requiring the filling of export sugar before milling of domestic consumption sugar may commence, apprehensions were felt in sugar circles especially those who have entered into sales contracts for delivery in January. Although during the latter part of the month some improvement was noted in the domestic market, only small sales were done in view of the doubts over release of domestic sugar for delivery in January or February.

Philippine Exports: According to reliable advices, Philippine sugar shipments to the United States during December amounted to 37,300 long tons of centrifugal and 23 long tons of refined. The aggregate shipments of these two classes of sugar for the first two months of the crop year 1935-36 follow:

	Long tons	
Centrifugal...	45,806	(incl. 506 tons 1934/35 quota)
Refined.....	23	
Total.....	45,829	(incl. 506 tons 1934/35 quota)

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were stepped up to 7 to 1, designers coming closer to their dream of 1 pound per horsepower: cutting engine weight raises useful load capacity. High compression provoked cooling troubles, solved by smaller radiators and faster pumps that also reduced head resistance and helped streamlining plans. Prestone, a cooling medium, followed, and then, air cooling: weight per horsepower upped somewhat, but reliability at altitude gained. Aircooled engines are replacing other types in American commercial and military aviation.

High compression and aircooling led to exhaust valve problems: first solved by reaming the valve stems and filling them with mercury, then by the modern valve sodium-filled. The refined speedier aircooled engines upped propeller revolutions per minute; reduction gears set between crankshaft and propeller shaft rotate the propeller at reduced speed with high efficiency.

Superchargers greatly increase power at high altitudes; they are of the gear-driven internal type, superceding exhaust-driven external types, and they induce sea-level atmosphere pressure at high altitudes with little strain on gears or engines. Among the alloy experiments proved serviceable are drop-forged heat-treated aluminum crankcases and cast magnesium cases and accessory bodies. Longerons and cross braces of wood with metal fittings in fuselages have given place to steel tubing of high tensile strength and thin wall, and fabric coverings have been replaced to plates of duraluminum (heat-treated aluminum alloy) styled metal skin. Applied to wind covering also, this material makes today's airplane practically all metal.

Improvements that have led to much greater speed and high cruising range include economized gasoline consumption, streamlining of all parts exposed to the slipstream, retractable landing gear, and variable-pitch propellers. Brakes make smaller landing fields practicable, and electrical and manually operated starters reduce take-off hazards—also helped by the higher mounting of the engines. Retractable landing gear greatly increases the airplane's speed, eliminating head resistance of wheels, struts, and axles—though these too are streamlined. Instruments that required constant checking for the pilot to determine his correct location have yielded to instruments gyroscopically controlled. The new altimeters enable pilots to know at what height they are flying if flying blind or in fog or during bad visibility.

The radio direction finder with the radio beacon system determine at all times the plane's location and enable the pilot to make any necessary correction in his course day or night, rain or shine; and neither fog nor wind affects the radio beacon. Safety is further secured by the robot or automatic pilot, particularly on direct routes or while keeping any given altitude: the automatic pilot is much more accurate than the human hand in correcting deviations in direction or altitude, and relieves the pilot himself of worries and stresses incident to cross-country flying. All the foregoing describing airplane improvements in general, omit military devices such as bomb sights, gun mounts, bomb carriers and release mechanism.

Passenger comforts in the new commercial airplanes are all that outlay cares to make them; in Pan American's clippers they are completely modern and passengers are accommodated in spacious compartments below and separate from the crew's quarters. This is possible only because the lightening of construction, especially of the engines per horsepower, gives much greater leeway for useful load. From this point the world may look ahead a little way, to adaptation of diesels to aviation: more power, and power more dependable at greatly reduced cost. (Colonel Sneed says Major I. Davies and Captain C. W. O'Connor of the air corps helped draft the notes on which our paper is based).

Acknowledgment

The picture of the *China Clipper* published in our December number, taken in Manila, was by Peter P. Wallace, headquarters company, 31st Infantry.