AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC.

AVIATION FACTS AND FIGURES 1953

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PREFACE

Aviation today has become one of the dominant forces in this nation's economy and security.

The development of the airplane has exerted such a profound effect on national and world affairs that only time and the studious analysis of events by future historians will enable us to view the first 50 years of aviation in proper perspective.

At this time, it suffices to say that an ever increasing proportion of the world's transportation is being conducted by air. This trend can be expected to continue. Paralleling this peaceful contribution to world progress has been the development of the airplane as the most decisive military weapon in world history.

Because of the increasing capabilities of the airplane as a weapon of defense and as a vehicle of commerce, public understanding of aviation —its capabilities and its limitations—is of extreme importance.

The contents of this 1953 edition of Aviation Facts and Figures have been brought together from many different sources with the hope that they will serve as a reference work of value to legislators, administrators and managers in government and industry, writers and editors, analysts and students.

D. C. Ramsey, Admiral, USN (Ret.)
President, Aircraft Industries Association

EDITORS' FOREWORD

This volume is not a work of original research. It merely brings together from hundreds of sources all the available facts which have been considered of importance or interest.

In using this book, readers should bear in mind two of its major limitations.

The first one is that much important information cannot be printed because of security reasons. Security restrictions are more severe today than they were during the Second World War. This has affected the chapters on production, military aviation, exports, training, and research and development. It has made impossible the preparation of a chapter on materials, knowledge of which is essential to a full understanding of aircraft production.

The second limitation lies in the lack of comparability among many of the tables shown in this book. Similar terms, such as "aviation," the "aeronautic industry," the "aircraft industry," the "airframe, engine and accessory industry," etc., often are used with different meanings. These differences may cause variations of billions of dollars between statistical tables apparently covering the same subject.

Here are some examples: Are guided missiles to be considered as pilotless aircraft—and do they therefore belong in the aircraft industry? The answer will affect statistics on the value of production by hundreds of millions of dollars.

Is the "component" industry part of the aircraft industry? A competent observer estimates that 1,600-1,800 manufacturers with 600,000 employees make up the component industry. Although the effect of including or excluding this industry in a statistical table is evident, too often it is impossible to determine which practice has been followed. There is no consistent pattern.

Problems of proper classification and clear definition occur constantly, and are made more difficult because of the rapid changes in the industry. Even if they were solved, there would still remain the problem of getting agreed-upon classifications and terms used by the many different sources of data.

We would like to express our sincere thanks to the many individuals and organizations (both government and private) who have made this book possible through their freely given advice and assistance. The Air

Transport Association has been kind enough to review the chapter on Airlines for factual correctness.

Our particular appreciation is extended to Mr. Charles L. Black for editing the text, to Miss Teressa Smith, who helped in the collection, checking and production of the statistical tables, and to Miss Helen Mruk for her assistance in typing and proofreading.

This book is published in answer to the many requests for statistical information which are made to our Public Relations and Industry Planning Services. We hope that all who use this book will let us know their suggestions and comments so that future editions may be made more helpful.

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November, 1953

CHAPTER I

PRODUCTION FACILITIES

The mobilization of the aircraft industry which followed the outbreak of the Korean War in June, 1950, required a broad-scale expansion of aircraft production facilities—land, buildings, machinery and equipment.

While many World War II facilities, created in an industry-wide expansion only a decade earlier, were still in existence, a substantial proportion had been made obsolete by technological advances embracing virtually every science and skill known to modern industry. There were new requirements for land, highly-specialized machinery and equipment —and even buildings.

Special-Purpose Machine Tools

The heavier gauges, more critical tolerances and specialized forms of modern aircraft imposed, for example, the need for larger and more complicated machine tools. It was necessary to procure and place into service tools such as special-purpose milling machines, large stretch-forming machines, giant hydraulic presses and other costly high-production machinery not economically practical for use on small peacetime orders.

More Land Needed

Additional land frequently was necessary for the long runways required by modern jet aircraft, for the increased maneuvering space needed by high-speed planes, and for testing areas remote from urban centers.

Modern Plant Requirements

Moreover, many of the plants suitable for World War II production or for non-aircraft manufacturing purposes were inadequate for the production of modern military planes. Airframe assembly today, for example, requires increasingly large plants, with higher ceilings, balconies, overhead cranes and wide bays. The production of some of the latest equipment installed in advanced airplane models requires facilities which are sound-proof, temperature-controlled and vibration-proof.

Major Facilities Problems

The problem of acquiring additional plant space was not so great at the beginning of the Korean War, however, as was that posed by the

shortage of the new and complex machine tools essential for modern combat plane production.

When the Korean War started, more than 60 million square feet of floor space were being used for aircraft production, as compared to the 9.5 million square feet in operation at the beginning of 1939 when European orders triggered the American industry's World War II expansion. Moreover, in 1950 a number of large government-owned plants were either on so-called "standby status" or were leased to industry under terms which made possible a quick return to the government in case of need.

Acquisition of machine tools quickly became a major problem. Although generally better equipped than ever before, and possessing a reserve of general-purpose tools, the aircraft industry was not adequately supplied with the highly specialized machines required to produce the latest model aircraft and engines.

Financing Facilities Expansion

As in World War II, the government offered tax amortization incentives to induce industry to use private capital for facilities expansion. In the case of manufacturers with a stable peacetime demand for their products, the effect of such tax amortization regulations is to postpone the payment of tax money. The tax savings during the emergency period amount to deferred levies which are recovered by the government after the emergency ends, provided peacetime business is sustained on a firm level.

During World War II, amortization provisions permitted manufacturers to write off facilities over a period of five years *or, if the emergency lasted a shorter time, during the period of the emergency.* Amortization provisions during the most recent build-up, however, stipulated that facilities expansion would have to be written off for tax purposes over a period of five years — even if the emergency conditions which brought about the expansion were of shorter duration.

Despite the increased risk to the aircraft industry posed by this change in government policy, the industry provided a much greater proportion of facilities expansion funds than was the case in World War II — 34.1 per cent as contrasted with 10.8 per cent.

At present, the scheduled expansion of aircraft production facilities is virtually completed, with floor space having approximately doubled and with most plants equipped with the specialized tooling required under current production programs.

TABLE 1-1. FLOOR SPACE OF AIRFRAME, ENGINE AND PROPELLER FACILITIES 1939–1953

(Millions of Square Feet)

Date	TOTAL[a]	Airframe	Engine	Propeller
Jan. 1, 1939	9.5	7.5	1.7	.3
Jan. 1, 1940	13.1	9.6	3.0	.5
Jan. 1, 1941	25.5	17.9	6.5	1.1
Jan. 1943	117.1	77.5	31.8	5.2
Dec. 1943	175.0	110.4	54.2	6.8
Dec. 1944	167.4	103.0	54.9	7.9
1947 (estimate)	54.1	39.0	13.5	1.6
1950 (estimate)	63.5	47.5	14.0	2.0
June 30, 1952[b]	122.8	82.3	38.4	2.1
June 30, 1953[b]	135.8	91.1	42.1	2.6

[a] Includes glider facilities in 1943 and 1944.

[b] Floor space reported as "available for military production."

Sources: 1939–1944: Aircraft Industries Association, "Aviation Facts and Figures, 1945," p. 2.
1947–1950: "Aviation Week," Feb. 26, 1951, p. 29.
1952–1953: Munitions Board, Office of Aircraft Programs.

TABLE 1–2. NET BOOK VALUE OF FACILITIES OF 12 MAJOR AIRFRAME COMPANIES[a] 1937–1952

(Millions of Dollars)

Year	Value	Year	Value
1937	$ 15.3	1945	$ 27.4
1938	16.7	1946	48.8
1939	23.4	1947	74.0
1940	54.5	1948	70.1
1941	110.3	1949	69.3
1942	92.6	1950	82.8
1943	103.7	1951	124.4
1944	69.9	1952	154.0

[a] Data represent totals for the 12 largest airframe companies from point of view of sales in each year. The composition of the 12 companies may vary from year to year. Due to the release of only consolidated data by United Aircraft Corporation, it has been impossible to consider for inclusion in this table the activities of the latter's Chance Vought and Sikorsky Divisions.

Source: Aircraft Industries Association, compiled from individual company reports.

TABLE 1–3. BOOK VALUE OF FACILITIES OF CORPORATIONS PRODUCING AIRCRAFT, ENGINES AND PARTS[a] 1930–1949

(Dollar Figures in Millions)

Year	Number of Corporations	Net Book Value of Facilities	Land Value	Buildings and Equipment		
				Gross Book Value[b]	Depreciation Reserves	Net Book Value
1930	157	$ 92.3	N.A.	N.A.	N.A.	N.A.
1931	132	64.8	N.A.	N.A.	N.A.	N.A.
1932	102	38.0	N.A.	N.A.	N.A.	N.A.
1933	95	34.5	N.A.	N.A.	N.A.	N.A.
1934	112	28.7	N.A.	N.A.	N.A.	N.A.
1935	117	31.9	N.A.	N.A.	N.A.	N.A.
1936	123	56.9	N.A.	N.A.	N.A.	N.A.
1937	126	63.7	N.A.	N.A.	N.A.	N.A.
1938	137	69.0	$ 4.0	$ 88.0	$ 22.9	$ 65.1
1939	156	93.0	5.6	114.3	26.9	87.4
1940	201	174.5	5.7	214.6	45.9	168.7
1941	249	323.8	23.6	498.4	198.2	300.2
1942[a]	339	761.8	27.5	1,373.0	638.7	734.3
1943[a]	462	858.7	50.1	1,687.6	879.0	808.6
1944[a]	472	774.9	46.7	1,669.6	941.4	728.2
1945[a]	385	730.7	40.8	1,702.7	1,012.8	689.9
1946	255	156.4	7.3	372.4	223.3	149.1
1947	218	166.1	6.4	337.6	177.9	159.7
1948	196	190.6	6.1	377.2	192.7	184.5
1949	220	207.3	6.1	408.3	207.2	201.1

N.A.—Not available.

[a] The classification is determined by the activity which accounts for the largest percentage of total receipts. During the war years some non-aircraft companies, such as General Motors Corporation, may have been classified as aircraft manufacturers.

[b] Includes intangible assets.

Source: Treasury Department, Bureau of Internal Revenue; unpublished data.

TABLE 1–4. EXPENDITURES FOR NEW PLANTS AND NEW EQUIPMENT BY THE AIRCRAFT INDUSTRY 1939–1952

(Millions of Dollars)

Year	TOTAL	For New Structures and Additions to Plant	For New Machinery and Equipment
1939	$ 21.4	$ 6.7	$14.7
1947	27.9	9.0	18.9
1949	44.3	17.1	27.2
1950	49.0	15.0	34.0
1951	153.0	73.3	79.7
1952	230.2	125.3	77.9

Sources: Bureau of the Census, "Census of Manufactures, 1939."

Bureau of the Census, 1951 Annual Survey of Manufactures, Advance Report, "Manufacturers' Expenditures for New Plants and New Equipment in the United States: 1951, 1950, 1949, 1947", pp. 10, 11.

Bureau of the Census, 1952 Annual Survey of Manufactures, "Manufacturers' Expenditures for New Plant and New Equipment: 1952, 1951, and 1947," p. 8.

TABLE 1–5. COST OF EMERGENCY FACILITIES EXPANSION, AIRCRAFT INDUSTRY, SECOND WORLD WAR AND KOREAN WAR

(Millions of Dollars)

	TOTAL	Privately Financed	Federally Financed
TOTAL EXPANSION			
1940–1945[a]	$3,894	$ 420	$3,474
1950–1953	3,528[E]	1,204[b]	2,324[E]
Structures			
1940–1945[a]	1,556	212	1,344
1950–1953	1,085[E]	805[c]	280[E]
Equipment			
1940–1945[a]	2,338	208	2,130
1950–1953	2,443[E]	399[d]	2,044[E]

[E] Estimate by Aircraft Industries Association of Air Force and Navy obligations since Korea. (Excludes funds for guided missiles, electronics, and Air Force Heavy Press Program.)

[a] Cost of manufacturing facilities authorized July 1940–June 1945.

[b] This is the total processed by the Aircraft Division of the National Production Authority. The difference between the 1204 million dollars shown here and the 908 million dollars shown in Tables 1–9 and 1–10 is due to applications either still pending with the Defense Production Administration on March 1, 1953 or denied by it.

[c] Totals of Tax Amortization Certificates for Land, Buildings, Furniture, and Miscellaneous processed by Aircraft Division of National Production Authority as of March 1, 1953.

[d] Totals of Tax Amortization Certificates for Plant Equipment, Machine Tools, etc., processed by Aircraft Division of National Production Authority as of March 1, 1953.

Sources: 1940–1945: Civilian Production Administration, Industrial Statistics Division, "Wartime Manufacturing Plant Expansion, Privately Financed, 1940–1945."

1950–1953: National Production Authority, Aircraft Division; unpublished data.

TABLE 1–6. AIRCRAFT, ENGINE AND ACCESSORY FACILITIES EXPANSION, 24 MAJOR MANUFACTURERS
SECOND WORLD WAR AND KOREAN WAR
(Millions of Dollars)

Name of Company	1940–1944[a]		1950–1953[b]	
	Federally Financed	Privately Financed	Federally Financed	Privately Financed
Bell Aircraft Corp.	$ 92.9	$ 5.8	N.A.	$ 6.2
Bendix Aviation Corp.	110.5	10.8	N.A.	15.3
Boeing Airplane Co.	71.1	5.4	N.A.	22.0
Chrysler Corp.	197.6	.8	N.A.	13.0
Consolidated Vultee Aircraft Corp.	142.4	27.5	N.A.	7.4
Continental Motors Corp.	87.8	2.1	N.A.	1.4
Curtiss-Wright Corp.	425.2	46.3	N.A.	22.5
Douglas Aircraft Co., Inc.	196.9	15.1	N.A.	18.1
Fairchild Engine & Airplane Corp.	41.6	1.4	N.A.	6.9
Ford Motor Co.	223.6	11.3	N.A.	50.8
General Electric Co.	49.6	3.1	N.A.	91.6
General Motors Corp.	501.3	33.7	N.A.	231.0
Hughes Tool Co.	N.A.	N.A.	N.A.	23.9
Lockheed Aircraft Corp.	29.8	25.1	N.A.	25.4
The Glenn L. Martin Co.	77.4	3.9	N.A.	4.0
McDonnell Aircraft Corp.	—	—	N.A.	20.8
Nash-Kelvinator Corp.	71.5	.1	N.A.	9.2
North American Aviation, Inc.	78.7	5.0	N.A.	12.9
Packard Motor Car Co.	93.1	.3	N.A.	17.7
Republic Aviation Corp.	45.1	.6	N.A.	9.9
The Sperry Corp.	44.9	1.0	N.A.	1.0
Studebaker Corp.	92.9	.5	N.A.	3.8
Thompson Products, Inc.	30.5	4.0	N.A.	11.3
United Aircraft Corp.	206.8	36.9	N.A.	99.5

N.A.—Not available.

[a] Value of facilities authorized.

[b] Value of Requests for Tax Amortization received by the Aircraft Division of National Production Authority as of March 10, 1953.

Sources: Surplus Property Administration, Report to the Congress, "Aircraft Plants and Facilities", January 14, 1946, p. 40.

National Production Authority, Aircraft Division; unpublished data.

TABLE 1–7. COST OF AIRCRAFT FACILITIES EXPANSION BY TYPE OF PRODUCT[a] SECOND WORLD WAR AND KOREAN WAR

(Millions of Dollars)

Type of Product	Second World War[b]	Korean War[c]
TOTAL	$3,756	$3,528
Airframe and Airframe Parts	1,367	710
Aircraft Engines and Parts	1,889	2,041
Aircraft Propellers and Parts	227	114
Equipment and Parts, n.e.c.	273	663

[a] Includes both federally and privately financed expansion.

[b] Includes only projects estimated to cost $25,000 or more in period July 1940–December 1944; includes projects financed by British government.

[c] Includes Federal cumulative obligations and scheduled private expenditures in period 1950–1953; does not include funds for guided missiles, aviation electronic equipment, and the Air Force's Heavy Press Program.

Sources: Second World War: War Production Board, Information Division, letter of November 16, 1944. War Production Board, Program and Statistics Bureau, letter of May 12, 1945.

Korean War: Department of Labor, Bureau of Employment Security, "Aircraft and Parts Manufacturing", April 1953, Industrial Manpower Survey #44, pp. 2, 5, 6.

TABLE 1–8. LOCATION OF AIRCRAFT, ENGINE, AND ACCESSORY FACILITIES EXPANSION, SECOND WORLD WAR AND KOREAN WAR.

(Millions of Dollars)

Location	Second World War[a]		Korean War[b]	
	Federally and Privately Financed		Federally and Privately Financed	
	Cost	Percent	Cost	Percent
TOTAL	$3,756	100.0	$3,528	100.0
New England				
Massachusetts	47	1.2	42	1.2
Connecticut	130	3.5	360	10.2
Middle Atlantic				
New York	363	9.7	240	6.8
New Jersey	195	5.2	208	5.9
East North Central				
Ohio	469	12.5	459	13.0
Indiana	259	6.9	265	7.5
Illinois	417	11.1	247	7.0
Michigan	443	11.8	610	17.3
West North Central				
Missouri	109	2.9	49	1.4
Kansas	81	2.1	51	1.4
South Atlantic				
Maryland	71	1.9	48	1.4
South Central				
Texas	123	3.3	77	2.2
Pacific				
California	245	6.5	370	10.5
Washington	43	1.1	54	1.5
Undistributed	761	20.3	448	12.7

[a] Includes only projects estimated to cost $25,000 or more for period July 1940–December 1944; also includes projects financed by British Government.

[b] Includes Federal cumulative obligations and scheduled private expenditures for period 1950–1953; does not include funds for guided missiles, aviation electronic equipment, and the Air Force's Heavy Press Program.

Sources: Second World War: War Production Board, letter of May 12, 1945.

Korean War: U. S. Department of Labor, Bureau of Employment Security, "Aircraft and Parts Manufacturing", April 1953, Industrial Manpower Survey #44, pp. 2, 5, 6.

TABLE 1–9. BREAKDOWN OF PRIVATELY FINANCED FACILITIES EXPANSION COVERED BY CERTIFICATES OF NECESSITY ISSUED 1950–1953
(Millions of Dollars)

Type of Plant	TOTAL ISSUED THRU MAR. 31, 1953	Construction	Machinery and Equipment	Land and Overhead
TOTAL:	$908.3	$598.8	$285.3	$24.2
Airframe.....	$144.3	$100.1	$ 42.2	$ 2.0
Aircraft Engines and Parts.....	527.8	367.0	146.4	14.4
Aircraft Propellers and Parts.....	29.4	15.3	12.5	1.6
Aircraft Parts and Auxiliary Equipment.....	206.8	116.4	84.2	6.2

Source: Office of Defense Mobilization, Materials Section.

TABLE 1–10. PROGRESS OF PRIVATELY FINANCED FACILITIES EXPANSION COVERED BY CERTIFICATES OF NECESSITY ISSUED 1950–1953

Type of Plant	Total Number of Certificates	Reported Cost (Thousands of Dollars)	Value in Place as of Mar. 31, 1953	
			Thousands of Dollars	Percent
TOTAL	1,444	$908,277	$701,329	77.2
Airframes.....	207	$144,314	$105,314	73.0
Aircraft Engines and Parts.	437	527,825	401,478	76.1
Aircraft Propellers and Parts.....	36	29,367	26,547	90.4
Aircraft Parts and Auxiliary Equipment.....	764	206,771	167,990	81.2

Source: Office of Defense Mobilization, Materials Section.

CHAPTER II

PRODUCTION

Modern technology has few problems of greater complexity than those faced in translating blueprints and dollars into high-performance military aircraft. The production effort itself is tremendous—tremendous in dollars, tremendous in terms of employment, tremendous in pounds of aircraft that must be produced.

Although frequently described as a mass production industry—comparable, for example, to the automobile industry—the aircraft industry is confronted with production problems which are in many respects unique. These unique problems stem from the nature of the aeronautical product itself, from the emergency conditions under which production frequently must occur, and from the governmental regulations which circumscribe many of the production processes.

Production Fluctuations

Throughout the industry's 50-year history, aircraft production has been in fits and starts, with peaks of effort required during emergencies and war years and with deep production cutbacks in peacetime.

In 1939, when World War II broke out in Europe, a total of 5,856 aircraft (of which only 2,195 were military types) were produced in the United States. With orders from Europe, followed by President Roosevelt's call for production of 50,000 planes per year, military aircraft output increased from 6,019 in 1940 to a World War II peak of 96,318 in 1944.

The defeat of Japan brought about an almost overnight curtailment of production—and output fell to only 1,669 military planes in 1946.

When the Korean War began in June, 1950, some 215 military aircraft were being built per month in the United States. Today, the industry has largely completed a limited emergency expansion, and is producing military planes at the approximate rate of 12,000 per year.

Rapid Aeronautical Progress

The history of the airplane has been one of continuing increases in performance and size, resulting in greater complexity and infinite precision in the manufacturing operation. With each advance, new techniques and methods, new tools and new processes have been made necessary. In most cases, this progress has been preceded by the necessity for

research and development in completely unexplored fields of human knowledge.

The advent of the jet engine is a current example of the way new developments in the aeronautical sciences are accompanied by problems which affect every element of the aircraft manufacturing process. When the jet powerplant made possible great increases in aircraft power ten years ago, it immediately brought with it the requirement for aircraft designs which would enable the efficient use of this power. New materials and new equipment had to be developed; and completely new production techniques and machines were necessary to build the resultant more complex aircraft.

Even after ten years of design and development, the full potential of the jet engine has not yet been realized—and additional design and production problems remain. A typical example is the problem created by the tremendous heat encountered at high speeds. The solution will require new designs, different equipment, more specialized machine tools and, in fact, a new basic metallurgy.

Other respects in which the aircraft industry differs from the conventional mass production industry include:

(1) *The inadvisability of freezing designs.* Aircraft designs can rarely be "frozen" to permit economy of production. Changes must constantly be made in order to keep pace with scientific and engineering advances. These changes mean re-work and delay and are costly—but they are necessary in order to maintain continuing superiority over advances in other parts of the world. As a result, production runs in the aircraft industry are small, and are never firmly established.

(2) *Dependence on contracts.* More than 90 percent of the aircraft industry's business is with the United States government. Unlike such industries as the automotive, which has millions of customers and can plan ahead for a reasonably certain mass market, the aircraft industry's work load has in the past been directly dependent upon national policy fluctuations dictated by changes in the international situation.

The instability of the work load creates problems in manpower and capital during periods of expansion and contraction.

(3) *Need for development continuity.* The need for continuity of management, research and development personnel, production facilities and production skill makes it necessary for the typical aircraft company to maintain large establishments even at the lowest points of the production curve. The basis for rapid advances in the aeronautical sciences lies in accumulated design, development and manufacturing experience, and the retention of production teams is in this respect more important

than the actual size of the industry at any particular period.

(4) *Aircraft lead time.* The production of modern military planes involves thousands of inter-related actions and months of time in assembling needed parts, materials and components. Some elements of production time are irreducible; others already have been shortened by manufacturers through continuing advances in manufacturing techniques.

The great complexity of the manufacturing process is one of many factors that make the production of modern aircraft a necessarily time-consuming operation. Among other factors are: (a) the time required for military experts to establish strategic requirements and to translate these requirements into performance specifications, (b) the time required for design competitions and for contract awards, (c) the time required to build experimental models and test them, (d) the time required to prepare the production plan, a project that requires knowledge of the production lead time of each of the thousands of parts and materials that go into the finished aircraft, and (e) the time required to test, analyze (and modify, if necessary) the first production aircraft.

(5) *Production in emergency periods.* In a period of full or limited emergency, a number of unusual and frequently costly measures must be employed to achieve accelerated production. Among such emergency measures are (a) an increase in working hours, (b) an increase in the number of working shifts, (c) the employment and training of new and unskilled personnel, (d) the construction and acquisition of new production facilities, (e) the addition of more specialized high-speed tooling, (f) the use of "licensees," who engage in airframe and engine production for the emergency period only, then return to their previous peacetime production fields. These licensees are provided with designs, blueprints and manufacturing know-how by the basic aircraft and engine industry.

During periods of accelerated production, too, thousands of new subcontractors are brought into the production picture and an increasing share of the work is done with these "outside" firms.

To further speed production in an emergency, special modification centers are sometimes established. Normally, design changes are made on the production line when volume output is not the first priority. Use of modification centers increases the rate of production, but also increases cost.

TABLE 2–1. THE FIFTY LARGEST DEFENSE CONTRACTORS
Second World War and Korean War

Dollar Value Ranking		Company	Contracts Awarded		
			July 1, 1950–Dec. 31, 1952		Second World War
Korean War	Second World War		Millions of Dollars	Percent of Total	Percent of Total[a]
		TOTAL—ALL CONTRACTS	$80,331.8	100.0	100.0
		TOTAL—50 COMPANIES[b]	43,409.8	53.9	—
1	1	General Motors Corp.	5,285.2	6.6	7.9
2	9	General Electric Co.	2,855.4	3.6	1.9
3	6	United Aircraft Corp.	2,336.6	2.9	2.2
4	8	Chrysler Corp.	2,151.9	2.7	1.9
5	5	Douglas Aircraft Co., Inc.	2,123.9	2.6	2.5
6	12	Boeing Airplane Co.	1,998.6	2.5	1.5
7	10	Lockheed Aircraft Corp.	1,911.8	2.4	1.9
8	3	Ford Motor Co.	1,658.2	2.1	3.0
9	11	North American Aviation, Inc.	1,473.7	1.8	1.6
10	24	Republic Aviation Corp.	1,456.6	1.8	0.7
11	2	Curtiss-Wright Corp.	1,222.7	1.5	4.1
12	34	American Locomotive Co.	1,213.3	1.5	0.5
13	13	American Telephone & Telegraph Co.	1,197.6	1.5	1.5
14	21	Westinghouse Electric Corp.	1,100.0	1.4	0.8
15	22	Grumman Aircraft Engineering Corp.	1,049.1	1.3	0.8
16	4	Consolidated Vultee Aircraft Corp.	973.3	1.2	2.8
17	19	Sperry Corp. (The)	755.8	0.9	0.9
18	17	Bendix Aviation Corp.	746.7	0.9	1.1
19[c]	100	Northrop Aircraft, Inc.	733.6	0.9	0.1
20	28	Studebaker Corp. (The)	724.8	0.9	0.7
21	33	International Harvester Co.	565.6	0.7	0.6
22	15	DuPont (E. I.) De Nemours & Co.	511.6	0.6	1.2
23	32	AVCO Manufacturing Corp.	480.8	0.6	0.6
24	43	Radio Corporation of America	480.4	0.6	0.3
25	N.A.	McDonnell Aircraft Corp.	474.5	0.6	N.A.
26	N.A.	Hughes Tool Co.	451.6	0.6	N.A.

TABLE 2–1. THE FIFTY LARGEST DEFENSE CONTRACTORS
Second World War and Korean War—*Continued*

Dollar Value Ranking		Company	Contracts Awarded		
			July 1, 1950–Dec. 31, 1952		Second World War
Korean War	Second World War		Millions of Dollars	Percent of Total	Percent of Total[a]
27	14	Martin (The Glenn L.) Co.	438.6	0.6	1.3
28	18	Packard Motor Car Co.	422.8	0.5	1.0
29	48	Willys-Overland Motors, Inc.	389.5	0.5	0.3
30	30	Goodyear Tire Rubber Co. (The)	357.5	0.4	0.6
31	N.A.	International Telephone and Telegraph Corp.	354.6	0.4	N.A.
32	73	Fairchild Engine and Airplane Corp.	339.5	0.4	0.2
33	62	Eastman Kodak Co.	338.0	0.4	0.2
34	65	Hercules Powder Co.	336.2	0.4	0.2
35	25	Bell Aircraft Corp.	332.2	0.4	0.7
36	27	Nash-Kelvinator Corp.	332.0	0.4	0.7
37	36	American Car and Foundry Co.	328.6	0.4	0.5
38	N.A.	Kaiser-Frazer Corp.	323.8	0.4	N.A.
39	N.A.	Reo Motors, Inc.	317.6	0.4	N.A.
40	57	Philco Corp.	305.2	0.4	0.3
41	55	Firestone Tire and Rubber Co.	285.8	0.4	0.3
42	N.A.	Collins Radio Co.	278.0	0.4	N.A.
43	51	American Woolen Co.	276.5	0.3	0.3
44	71	Raytheon Manufacturing Co.	262.7	0.3	0.2
45	64	Food Machinery and Chemical Corp.	259.8	0.3	0.2
46	N.A.	Olin Industries, Inc.	246.8	0.3	N.A.
47	37	United States Rubber Co.	243.2	0.3	0.5
48	N.A.	International Business Machines Corp.	240.1	0.3	N.A.
49	23	Newport News Shipbuilding & Drydock Co.	236.3	0.3	0.7
50	N.A.	Stevens (J. P.) & Co., Inc.	231.2	0.3	N.A.

N.A.—Not available.

[a] Based on the 100 companies with the largest dollar value of war supply contracts which were awarded from June 1940 through September 1944.

[b] Company totals include contracts with all subsidiaries and affiliates.

[c] Includes contracts awarded to Radioplane Company, purchased by Northrop in latter half of 1952.

Sources: Second World War: War Production Board.
Korean War: Munitions Board, "Analysis of Large Military Prime Contractors," Report No. 3C, dated June 16, 1953.

TABLE 2-2. VALUE OF AIRCRAFT AND PARTS PRODUCED
1914–1953
(Thousands of Dollars)

Year	Cost of Materials, Supplies, Fuel, Purchased Electric Energy, and Contract Work[a]	Value Added by Manufacture[b]	Value of Products[c]
1914	$ 134	$ 656	$ 790
1919	7,127	7,246	14,373
1921	2,407	4,235	6,642
1923	3,829	9,116	12,945
1925	2,870	9,655	12,525
1927	7,517	13,645	21,162
1929	27,368	43,785	71,153
1931	13,101	27,177	40,278
1933	7,957	18,503	26,460
1935	14,361	30,986	45,347
1937	56,556	93,144	149,700
1939	96,250	183,247	279,497
1947	N.A.	954,575	1,200,000[d]
1949	N.A.	1,344,068	1,781,000
1950	N.A.	1,550,551	2,274,000
1951	N.A.	2,662,993	3,456,000
1952	N.A.	4.404,823	6,497,000
1953	N.A.	N.A.	9,300,000[d]

N.A.—Not available.

[a] Figures for years prior to 1935 do not include cost of contract work.

[b] Value of products less cost of materials, supplies, fuel, purchased electric energy, and contract work.

[c] For 1914–1939, value of products made; for 1949–1952 sales as reported by Bureau of Census, "Facts for Industry", Series M42D with AIA estimates for 1947 and 1953.

1914–1929: Total selling values at plant of aircraft and installed engines.

1931–1933: Value of aircraft less value of engines installed.

1935: Includes value of instruments and accessories, but not the value of engines, propellers and power plant accessories.

1937–1939: Includes value of instruments, accessories, engines, propellers and power plant accessories.

[d] Estimates by Aircraft Industries Association.

Sources: 1914–1939: Bureau of the Census, 16th Census, "Manufactures 1939—Aircraft and Parts, including Aircraft Engines," p. 19, Table 1.

1947–1952: *Value Added by Manufacture*—Bureau of the Census, Advance Report 1951 Annual Survey of Manufactures, "General Statistics for Industry Groups and Selected Industries", p. 18-A; 1952 Annual Survey of Manufactures.

1947–1952: *Value of Products*—Bureau of the Census, "Facts for Industry", Series M42D (Monthly).

1947 and 1953: Aircraft Industries Association estimate.

TABLE 2–3. VALUE OF AIRPLANES AND ENGINES PRODUCED AND SPARES SOLD 1925–1939
(Millions of Dollars)

Year	Airplanes Less Engines			Engines			Spare Parts Sold		
	TOTAL	Civil	Military	TOTAL	Civil	Military	TOTAL	Civil	Military
1925	6.7	1.5	5.2	N.A.	N.A.	N.A.	N.A.	N.A.	N.A
1926	8.9	2.7	6.2	N.A.	N.A.	4.1	N.A.	N.A.	N.A.
1927	14.5	7.0	7.5	N.A.	N.A.	6.6	N.A.	N.A.	N.A.
1928	36.3	17.2	19.1	13.4	1.0	12.4	N.A.	N.A.	N.A.
1929	44.4	33.6	10.8	26.5	17.9	8.6	N.A.	N.A.	N.A.
1930	21.4	10.7	10.7	17.1	6.3	10.8	13.2	6.9	6.3
1931	19.7	6.7	13.0	14.5	4.1	10.4	12.9	4.4	8.5
1932	12.7	2.3	10.4	9.3	2.9	6.4	10.0	2.6	7.4
1933	16.0	6.2	9.8	9.7	4.7	5.0	7.8	2.7	5.1
1934	18.8	10.0	8.8	15.5	10.3	5.2	8.5	4.8	3.7
1935	21.8	10.4	11.4	12.7	6.5	6.2	10.7	5.5	5.2
1936	40.2	12.4	27.8	22.1	7.5	14.6	14.8	6.7	8.1
1937	56.3	19.2	37.1	30.1	15.3	14.8	27.9	14.0	13.9
1939	157.0	27.8	129.2	74.3	N.A.	N.A.	37.2	N.A.	N.A.

N.A.—Not available.

Sources: 1925–1937: Aeronautical Chamber of Commerce, "The Aircraft Yearbook, 1935," p. 454 1938, p. 442.

1939: Estimate based on Bureau of the Census, 16th Census, "Manufactures, 1939, Aircraft and Parts, including Aircraft Engines," Tables 4 and 5 and footnotes. Engine Parts included with engines. Experimental work of about 11 million dollars not allocated.

TABLE 2–4. VALUE OF MILITARY AIRFRAMES, ENGINES, PROPELLERS, AND SPARE PARTS PRODUCED AND OF TOTAL AIRCRAFT PRODUCTION, JULY 1, 1940–AUGUST 31, 1945[a]
(Millions of Dollars—at August 1943 Unit Costs)

Year	TOTAL AIRCRAFT[b]	TOTAL	Airframes	Engines	Propellers	Airplane Spare Parts
1940, July-Dec.	$ 370	$ 342	$ 146	$ 101	$ 21	$ 74
1941	1,804	1,697	819	436	63	379
1942	5,817	5,497	2,762	1,314	191	1,230
1943	12,514	11,917	6,696	2,226	347	2,648
1944	16,047	15,654	9,233	3,075	407	2,939
1945, Jan.–Aug.	8,279	7,998	4,812	1,624	198	1,364

[a] Includes only military production in the United States.

[b] Including aircraft other than airplanes, air-borne equipment, experimental, research, and development.

Source: War Production Board, Bureau of Program and Statistics, Military Aircraft Branch.

TABLE 2–5. SALES OF AIRCRAFT, AIRCRAFT ENGINES, PROPELLERS AND PARTS 1948–1953

(Millions of Dollars)

Year	Total	Complete Aircraft and Parts			Aircraft Engines and Parts			Aircraft Propellers and Parts			Other Products and Services
		Total	U.S. Military	Other	Total	U.S. Military	Other	Total	U.S. Military	Other	
1948[a]	$1,158	$ 748	$ 626	$122	$ 265	$ 222	$ 43	$ 48	$ 36	$12	$ 97
1949	1,781	1,098	927	171	508	461	47	62	50	12	113
1950	2,274	1,416	1,255	161	583	519	64	75	62	13	200
1951	3,456	1,883	1,657	226	879	779	100	110	89	21	584
1952	6,497	3,897	3,442	455	1,609	1,440	169	148	122	26	843
1953 Six mos.	4,244	2,627	2,383	244	1,148	1,063	85	93	79	14	376

[a] Total for last three quarters of 1948 only.

Source: Bureau of the Census, "Facts for Industry", Series M42D (Quarterly).

TABLE 2-6. U. S. AIRCRAFT PRODUCTION
1909–1953
(Number of aircraft)

Year	TOTAL	Military	Civil
1909	N.A.	1	N.A.
1910	N.A.	—	N.A.
1911	N.A.	11	N.A.
1912	45	16	29
1913	43	14	29
1914	49	15	34
1915	178	26	152
1916	411	142	269
1917	2,148	2,013	135
1918	14,020	13,991	29
1919	780	682	98
1920	328	256	72
1921	437	389	48
1922	263	226	37
1923	743	687	56
1924	377	317	60
1925	789	447	342
1926	1,186	532	654
1927	1,995	621	1,374
1928	4,346	1,219	3,127
1929	6,193	677	5,516
1930	3,437	747	2,690
1931	2,800	812	1,988
1932	1,396	593	803
1933	1,324	466	858
1934	1,615	437	1,178
1935	1,710	459	1,251
1936	3,010	1,141	1,869
1937	3,773	949	2,824
1938	3,623	1,800	1,823
1939	5,856	2,195	3,661
1940	12,804	6,019[b]	6,785[c]
1941	26,277[a]	19,433[b]	6,844[c]
1942	47,836[a]	47,836[b]	[d]
1943	85,898[a]	85,898[b]	[d]
1944	96,318[a]	96,318[b]	[d]
1945	49,761[a]	47,714[b]	2,047

TABLE 2-6. U. S. AIRCRAFT PRODUCTION 1909–1953—*Continued*
(Number of Aircraft)

Year	TOTAL	Military	Civil
1946	36,670	1,669	35,001
1947	17,717	2,100	15,617
1948	9,586	2,284	7,302
1949	6,089	2,544	3,545
1950	6,520[e]	3,000[e]	3,520
1951	7,877[e]	5,400[e]	2,477
1952	12,509[e]	9,000[e]	3,509
1953	16,700[e]	12,000[e]	4,700[e f]

N.A.—Not available.
[a] Includes United States-financed aircraft manufactured in Canada.
[b] Includes military aircraft for Lend-Lease shipments.
[c] Includes domestic civil output only; data on new aircraft produced for export not available.
[d] No production other than military.
[e] Estimates by Aircraft Industries Association.
[f] Civil aircraft shipments Jan.–August totaled 3,015.

Sources: 1909–1925: Department of Commerce, "Air Commerce Bulletin," Vol. 1, No. 5, p. 6. Consumption.

Military aircraft production data:
1926–1927: "Disposal of Surplus Aircraft and Major Components Thereof," Senate Subcommittee Print No. 6, June 26, 1944, p. 92.
1928–1937: Aeronautical Chamber of Commerce, "The Aircraft Yearbook," 1935, p. 454; 1938, p. 442.
1938–1939: Munitions Board.
1940–1945: Department of Commerce, Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances 1940–1945," pp. 2–3.
1946–1947: Civil Aeronautics Administration, "CAA Statistical Handbook of Civil Aviation," 1950, p. 41.
1948–1949: United States Air Force, and Bureau of Aeronautics, Department of the Navy.
1950–1953: Estimates by Aircraft Industries Association.

Civil aircraft production data:
1926–1945: Civil Aeronautics Administration, "CAA Statistical Handbook of Civil Aviation," 1950, p. 41.
1946–1952: Bureau of the Census, "Facts for Industry," Series M42A (Monthly).
1953: Estimate by Aircraft Industries Association.

TABLE 2–7. U. S. AIRFRAME WEIGHT PRODUCTION
1939–1953

Year	Weight in Millions of Pounds (Excluding Spares)		
	TOTAL	Military	Civil
1939	12.5	10.1	2.4[a]
1940	27.8	23.1	4.7[a]
1941	86.1	81.4	4.7[a]
1942	275.9	275.9	[b]
1943	654.7	654.7	[b]
1944	962.4	962.4	[b]
1945	542.2	540.5	1.7
1946	38.4	12.9	25.5
1947	29.3	11.4	17.9
1948	35.3	25.2	10.1
1949	36.5	29.8	6.7
1950	42.2[a]	36.2[a]	6.0
1951	55.1[a]	50.0[a]	5.1
1952	114.5[a]	105.0[a]	9.5
1953	151.0[a]	140.0[a]	11.0[a] [c]

[a] Estimates by Aircraft Industries Association.
[b] No production other than military.
[c] Actual Jan.–August totaled 6,821,600 pounds.

Sources: Military—1939: Letter, Office of Public Information, Department of Defense.
1940–1945: Civil Aeronautics Administration, "U. S. Aircraft Acceptances 1940–1945", pp. 2, 3.
1946–1949: Bureau of the Census, "Facts for Industry", Series M42A (Monthly).
1950–1953: Estimates by Aircraft Industries Association.
Civil—1939–1941: Estimates by Aircraft Industries Association.
1945: Civil Aeronautics Administration, Report No. ACA–503.
1946–1952: Bureau of the Census, "Facts for Industry", Series M42A (Monthly).
1953: Estimates by Aircraft Industries Association.

TABLE 2–8. MILITARY AIRCRAFT PRODUCTION, BY MONTHS
1939–1945
(Number of Aircraft)

Month	1939[a]	1940	1941	1942	1943	1944	1945
TOTAL	2,141	6,019	19,433	47,836	85,898	96,318	47,714
Jan	143	254	1,013	2,978	5,013	8,788	6,531
Feb	163	257	980	3,092	5,450	8,759	6,294
Mar	180	296	1,133	3,493	6,258	9,113	7,035
Apr	152	402	1,384	3,500	6,471	8,329	6,410
May	180	450	1,339	3,983	7,086	8,902	6,350
June	211	553	1,479	3,736	7,094	8,044	5,785
July	247	574	1,459	4,107	7,371	7,998	4,729
Aug	256	547	1,850	4,274	7,611	7,932	2,868
Sept	117	541	1,926	4,301	7,596	7,589	765
Oct	51	625	2,282	4,064	8,360	7,425	457
Nov	104	682	2,127	4,815	8,787	6,746	248
Dec	337	838	2,461	5,493	8,801	6,693	242

[a] Because of different sources, 1939 military production total differs slightly from total in Table 2–6.
Sources: 1939: Gen. H. H. Arnold at Military Establishment Appropriation Bill, 1941, Hearings, March 7, 1940, p. 479.
1940–1945: Civil Aeronautics Administration, "U. S. Military Acceptances 1940–1945", p. 5.

TABLE 2–9. AIRFRAME WEIGHT OF MILITARY AIRCRAFT PRODUCED, BY MONTHS
1938–1945
(Includes Spares)

Month	Airframe Weight in Millions of Pounds							
	1938	1939	1940	1941	1942	1943	1944	1945
TOTAL	7.2	11.1	24.6	90.6	314.8	758.8	1,101.0	599.6
Jan	N.A.	N.A.	1.6	3.6	15.0	37.4	92.0	81.2
Feb	N.A.	N.A.	1.5	4.3	16.7	43.8	94.4	83.3
Mar	N.A.	N.A.	1.4	4.9	20.3	50.5	103.0	86.9
Apr	N.A.	N.A.	1.5	6.5	20.1	55.1	95.8	81.4
May	N.A.	N.A.	2.2	6.2	23.2	60.5	102.4	80.9
June	N.A.	N.A.	2.4	7.0	24.7	61.3	95.8	72.6
July	N.A.	N.A.	2.3	6.3	27.4	65.3	91.7	59.5
Aug	N.A.	N.A.	2.0	8.8	29.0	69.0	90.1	34.9
Sept	N.A.	N.A.	1.7	9.1	31.9	70.8	88.9	11.9
Oct	N.A.	N.A.	2.2	10.7	30.8	76.3	85.1	3.6
Nov	N.A.	N.A.	2.4	9.6	34.9	82.5	81.2	1.6
Dec	N.A.	N.A.	3.4	13.6	40.8	86.3	80.6	1.8

N.A.—Not available.
Sources: 1938–1939: Munitions Board estimates; includes 10% allowance for spares.
1940: Files of Aircraft Resources Control Office.
1941–1945: Civil Aeronautics Administration, "U. S. Aircraft Acceptances, 1940–1945", p. 5.

TABLE 2–10. AIRFRAME WEIGHT OF MILITARY AIRCRAFT PRODUCED, BY MONTHS 1940–1945
(Excludes Spares)

Month	Airframe Weight in Millions of Pounds					
	1940	1941	1942	1943	1944	1945
TOTAL	23.1	81.4	275.9	654.7	962.4	540.5
Jan	1.3	3.5	13.4	31.8	78.8	72.2
Feb	1.3	4.1	15.3	37.4	81.4	71.8
Mar	1.3	4.5	17.8	43.2	89.0	79.1
Apr	1.5	5.9	17.7	47.6	82.3	73.8
May	1.9	5.6	20.9	52.2	89.6	71.6
June	2.2	6.1	21.5	53.4	84.1	65.2
July	2.3	5.9	24.0	55.7	80.2	53.0
Aug	2.0	7.7	25.2	59.4	79.4	34.9
Sept	1.6	8.1	27.8	61.3	79.2	11.9
Oct	2.1	9.2	25.9	66.7	75.2	3.6
Nov	2.4	8.5	30.6	71.3	71.6	1.6
Dec	3.2	12.3	35.8	74.7	71.6	1.8

Source: Civil Aeronautics Administration, "U. S. Aircraft Acceptances 1940–1945", pp. 59–100.

TABLE 2–11. PRODUCTION OF MILITARY AIRCRAFT, BY TYPE 1940–1945

Year	TOTAL	Bombers	Fighters	Transports	Trainers	Other[a]
Number						
TOTAL	303,218	98,783	101,427	24,281	58,560	20,167
1940	6,019	1,191	1,685	290	2,731	122
1941	19,433	4,115	4,416	532	9,373	997
1942	47,836	12,627	10,769	1,984	17,631	4,825
1943	85,898	29,355	23,988	7,012	19,939	5,604
1944	96,318	35,003	38,873	9,834	7,577	5,031
1945	47,714	16,492	21,696	4,629	1,309	3,588
Percent						
TOTAL	100.0	32.6	33.4	8.0	19.3	6.7
1940	100.0	19.8	28.0	4.8	45.4	2.0
1941	100.0	21.2	22.7	2.8	48.2	5.1
1942	100.0	26.4	22.5	4.1	36.9	10.1
1943	100.0	34.2	27.9	8.2	23.2	6.5
1944	100.0	36.3	40.4	10.2	7.9	5.2
1945	100.0	34.6	45.5	9.7	2.7	7.5

[a] Includes reconnaissance, communications, and special purpose aircraft.
Source: Civil Aeronautics Administration, "U. S. Aircraft Acceptances 1940–1945", pp. 2, 3. Percentages computed by Aircraft Industries Association.

TABLE 2-12. AIRFRAME WEIGHT OF MILITARY AIRCRAFT PRODUCED, BY TYPE 1940–1945
(Excluding Spares)

Year	TOTAL	Bombers	Fighters	Transports	Trainers	Other[a]
Pounds (Millions)						
TOTAL	2,538.0	1,575.9	533.9	269.0	132.6	26.6
1940	23.1	9.2	5.5	2.5	5.6	.3
1941	81.4	40.9	16.4	3.8	18.1	2.2
1942	275.9	162.5	48.8	18.2	39.3	7.1
1943	654.7	422.9	121.9	55.5	47.1	7.3
1944	962.4	609.2	215.5	113.6	19.1	5.0
1945	540.5	331.2	125.8	75.4	3.4	4.7
Percent						
TOTAL	100.0	62.1	21.0	10.6	5.2	1.1
1940	100.0	39.8	23.8	10.8	24.3	1.3
1941	100.0	50.2	20.2	4.7	22.2	2.7
1942	100.0	58.9	17.7	6.6	14.2	2.6
1943	100.0	64.6	18.6	8.5	7.2	1.1
1944	100.0	63.3	22.4	11.8	2.0	.5
1945	100.0	61.3	23.3	13.9	.6	.9

[a] Includes reconnaissance, communications, and special purpose aircraft.
Source: Civil Aeronautics Administration, "U. S. Aircraft Acceptances 1940–1945", pp. 2, 3. Percentages computed by Aircraft Industries Association.

TABLE 2–13. MILITARY AIRCRAFT PRODUCED, BY MANUFACTURER
1940–1945
(Number of Aircraft)

Manufacturer	TOTAL	1940	1941	1942	1943	1944	1945
TOTAL	303,218	6,019	19,433	47,836	85,898	96,318	47,714
Aeronca Aircraft Corp.	2,439	—	29	829	1,276	305	—
Beech Aircraft Corp.	7,430	49	255	1,924	2,610	1,979	613
Bell Aircraft Corp.	13,617	24	927	1,972	4,978	3,749	1,967
Boeing Airplane Co.	18,609	651	2,407	3,661	5,145	4,609	2,136
Brewster Aero Corp.	1,996	160	311	188	703	634	—
Canadian Car & Foundry	834	—	—	—	29	497	308
Cessna Aircraft Corp.	5,359	6	618	1,435	2,829	471	—
Chance-Vought (United Aircraft)	8,007	57	632	819	1,780	2,673	2,046
Consolidated Vultee Aircraft Corp.	30,975	267	2,652	6,812	10,496	7,956	2,792
Culver Aircraft Corp.	2,363	1	6	184	401	877	894
Curtiss Airplane Div.	26,788	1,356	2,757	5,865	6,577	6,720	3,513
Douglas Aircraft Co.	31,110	594	1,316	3,802	9,592	11,099	4,707
Eastern Aircraft Division, General Motors	13,473	—	—	26	2,546	6,611	4,290
Fairchild Aircraft Div.	6,384	267	963	1,878	2,070	1,097	109
Fleet Aviation, Ltd.	1,150	—	—	7	1,094	49	—
Ford Motor Company	6,791	—	—	24	1,291	3,990	1,486
Globe Aircraft Corp.	600	—	—	—	268	332	—
Goodyear Aircraft Corp.	4,014	—	—	—	377	2,108	1,529
Grumman Aircraft Engr. Corp.	17,612	145	426	2,274	4,404	6,325	4,038
Howard Aircraft Co.	832	—	6	30	617	179	—
Lockheed Aircraft Corp.	19,267	386	1,449	3,521	5,235	5,855	2,821
Glenn L. Martin Co.	9,023	237	547	1,430	3,509	2,309	991
Naval Aircraft Factory	1,371	228	611	318	98	97	19
Noorduyn Aviation Co.	2,256	—	6	441	1,223	500	86
North American Aviation, Inc.	42,013	1,245	2,552	6,033	9,106	14,858	8,219
Northrop Aircraft Corp.	1,124	—	24	291	141	449	219
Piper Aircraft Corp.	5,941	—	44	1,855	1,319	1,904	819
Republic Aviation Corp.	15,755	153	170	634	4,155	6,986	3,657
Ryan Aeronautical Co.	1,509	152	607	679	5	—	66
Taylorcraft Aviation Corp.	1,940	—	24	529	1,161	226	—
All Other[a]	2,636	41	94	375	863	874	389

[a] Includes all companies producing less than 500 planes.

Source: Civil Aeronautics Administration "U. S. Military Aircraft Acceptances, 1940–1945", pp. 35–56.

TABLE 2–14. AIRFRAME WEIGHT OF MILITARY AIRCRAFT PRODUCED BY MANUFACTURER[a]
1940–1945
(Thousands of Pounds)

MANUFACTURER	TOTAL	1940	1941	1942	1943	1944	1945
TOTAL	2,538,072	23,107	81,422	275,949	654,657	962,406	540,531
Aeronca Aircraft Corp.	2,266	—	27	509	1,367	363	—
Beech Aircraft Corp.	26,238	195	906	6,754	9,092	7,074	2,217
Bell Aircraft Corp.	82,636	142	3,422	7,296	18,602	23,578	29,596
Boeing Airplane Co.	318,134	2,114	7,907	34,855	66,435	115,164	91,659
Brewster Aero Corp.	10,996	480	933	1,253	4,786	3,544	—
Canadian Car & Foundry.	5,918	—	—	—	201	3,429	2,288
Cessna Aircraft Corp.	14,073	16	1,609	3,749	7,439	1,260	—
Chance-Vought (United Aircraft)	40,395	124	1,707	2,638	9,790	14,704	11,432
Columbia Aircraft Corp.	1,068	—	—	—	44	653	371
Consolidated-Vultee Aircraft Corp.	326,819	922	13,308	50,810	110,815	115,224	35,740
Culver Aircraft Corp.	1,878	1	6	101	228	749	793
Curtiss Airplane Div.	182,097	4,370	9,280	23,306	37,108	62,165	45,868
Douglas Aircraft Co., Inc.	386,831	4,655	10,758	35,490	102,485	153,056	80,387
Eastern Aircraft Div., General Motors	73,306	—	—	104	12,764	35,001	25,437
Fairchild Aircraft Division	11,014	317	1,316	2,610	2,883	2,975	913
Fleet Aviation, Ltd.	1,717	—	—	10	1,633	74	—
Ford Motor Company	157,311	—	—	556	29,952	92,569	34,234
Globe Aircraft Corp.	1,979	—	—	—	884	1,095	—
Goodyear Aircraft Corp.	22,233	—	—	—	2,075	11,594	8,564
Grumman Aircraft Engineering Corp.	97,226	513	1,414	10,258	26,259	35,354	23,428
Howard Aircraft Company	1,435	—	12	58	1,008	357	—
Lockheed Aircraft Corp.	215,679	3,014	11,887	32,483	61,200	71,546	35,549
Glenn L. Martin Company	160,329	1,723	6,040	20,779	56,223	42,207	33,357
Naval Aircraft Factory	4,379	320	889	796	668	1,338	368
Noorduyn Aviation Co.	6,469	—	19	1,191	3,407	1,577	275
North American Aviation, Inc.	259,239	3,633	8,591	32,477	57,133	109,076	48,329
Northrop Aircraft Corp.	12,670	—	127	1,980	1,185	6,271	3,107
Piper Aircraft Corp.	2,954	—	22	916	653	950	413
Republic Aviation Corp.	101,069	385	570	3,559	26,566	44,812	25,177
Ryan Aeronautical Co.	1,550	125	513	579	5	—	328
Taylorcraft Aviation Corp.	1,109	—	12	288	673	136	—
Canadian Vickers, Ltd.	3,418	—	—	—	—	3,035	383
All Other[b]	3,637	58	147	544	1,094	1,476	318

[a] Excludes spares.

[b] Includes all manufacturers producing less than 1 million pounds of airframe weight.

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940–1945", pp. 57–100.

TABLE 2–15. MONTHLY OUTPUT PER WORKER, 1941–1945
(Pounds of Airframe Weight, Including Spares, Accepted per Employee)
Adjusted for Subcontracting[a]

Month	1941	1942	1943	1944	1945
January	23	40	39	79	92
February	26	41	44	82	86
March	28	46	49	91	96
April	35	43	52	87	94
May	32	47	56	94	N.A.
June	33	46	55	91	N.A.
July	27	47	57	89	N.A.
August	34	46	60	89	N.A.
September	33	46	60	91	N.A.
October	36	41	64	90	N.A.
November	30	43	69	88	N.A.
December	40	46	73	88	N.A.

N.A.—Not available.
[a] Weight of spares included in computation of average.
Source: Bureau of Labor Statistics, "Monthly Labor Review," November 1944, p. 930. Revised by data from the files of the Bureau of Labor Statistics, Division of Construction and Public Employment.

TABLE 2–16. MILITARY AIRCRAFT ENGINE PRODUCTION, BY HORSEPOWER CAPACITY
1940–1945
(Number of Engines)

Year	TOTAL	Under 300 H.P.	300 to 999 H.P.	1000 to 1599 H.P.	1600 to 2399 H.P.	2400 H.P. and over
1940	22,667	10,138	4,422	7,149	1,956	2
1941	58,181	18,652	12,841	17,526	9,161	1
1942	138,089	23,737	23,085	61,265	30,002	—
1943	227,116	29,741	23,871	127,011	46,455	38
1944	256,789[a]	11,101	13,267	146,585	85,699	137
1945	108,442[b]	3,366	857	40,684	63,415	120

[a] Excludes 122 jet engines.
[b] Excludes 1,208 jet engines.
Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances 1940–1945," pp 139–163.

TABLE 2-17. AIRCRAFT ENGINE PRODUCTION, 1917-1952

Year	TOTAL	Military	Civil
1917-1919	N.A.	44,453	N.A.
1926	N.A.	842	N.A.
1927	N.A.	1,397	N.A.
1928	3,252	2,620	632
1929	7,378	1,861	5,517
1930	3,766	1,841	1,925
1931	3,776	1,800	1,976
1932	1,898	1,085	813
1933	1,980	860	1,120
1934	2,736	688	2,048
1935	2,965	991	1,974
1936	4,237	1,804	2,433
1937	6,084	1,989	4,095
1938	N.A.	N.A.	3,800[E]
1939	11,172	N.A.	N.A.
1940	30,167[E]	22,667	7,500[E]
1941	64,681[E]	58,181	6,500[E]
1942	138,089	138,089	—
1943	227,116	227,116	—
1944	256,911	256,911	—
1945	111,650[E]	109,650	2,000[E]
1946	43,407	2,585	40,822
1947	21,159	4,808	16,351
1948	N.A.	N.A.	9,032
1949	N.A.	N.A.	3,982
1950	N.A.	N.A.	4,314
1951	N.A.	N.A.	4,580
1952	34,382[E]	29,000[E]	5,382

N.A.—Not available.

[E] Estimate by Aircraft Industries Association.

Sources: 1917-1919: "Disposal of Surplus Aircraft and Major Components Thereof," Senate Subcommittee Print No. 6, June 26, 1944, p. 71.

1926-1937: Aeronautical Chamber of Commerce, "The Aircraft Year Book," 1938, p. 442.

1938: Aircraft Industries Association estimate.

1939: Bureau of the Census, 16th Census, "Manufactures 1939—Aircraft and Parts, Including Aircraft Engines," p. 20, Table 5.

1940-1945: *Military*: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940-1945," p. 7.

1940, 1941, 1945: *Civil*: Aircraft Industries Association estimate.

1946-1947: Bureau of the Census, "Facts for Industry," M42C-16, M42A-01.

1948-1951: *Military*: No estimate available.

1952: *Military*: Aircraft Industries Association estimate.

1948-1952: *Civil*: Bureau of the Census, "Facts for Industry," Series M42A (Monthly).

TABLE 2–18. NUMBER AND HORSEPOWER[a] OF MILITARY AIRCRAFT ENGINES PRODUCED, BY MONTHS
1940–1945

Month	1940		1941		1942	
	Number	Horsepower, in Thousands	Number	Horsepower, in Thousands	Number	Horsepower, in Thousands
TOTAL	22,667	15,468	58,181	44,930	138,089	147,535
January	856	646	3,181	2,259	7,257	7,389
February	866	647	3,630	2,509	7,404	7,608
March	1,171	769	3,918	2,901	9,483	9,228
April	1,358	779	4,265	3,164	10,131	10,234
May	1,194	734	4,119	3,196	10,931	11,152
June	1,709	1,064	4,407	3,476	11,735	12,165
July	2,056	1,240	5,041	3,993	11,926	13,045
August	2,250	1,470	5,514	4,148	13,061	14,487
September	2,639	1,713	5,660	4,270	13,224	14,509
October	3,112	2,107	5,624	4,283	13,716	15,451
November	2,522	1,945	6,246	5,201	14,233	15,566
December	2,934	2,354	6,576	5,530	14,988	16,701

TABLE 2-18. NUMBER AND HORSEPOWER[a] OF MILITARY AIRCRAFT ENGINES PRODUCED BY MONTHS—*Continued*

1940–1945

1943		1944		1945	
Number	Horsepower, in Thousands	Number	Horsepower,[b] in Thousands	Number	Horsepower,[c] in Thousands
227,116	262,282	256,911	368,050	109,650	184,187
16,063	17,335	22,696	29,961	17,323	27,576
15,302	16,861	21,146	27,734	15,684	25,612
17,012	19,238	23,994	32,847	16,669	27,735
16,849	18,576	22,690	31,228	14,016	24,120
17,891	19,597	22,819	32,381	14,427	24,605
18,008	19,939	23,093	33,301	11,251	19,971
18,738	21,241	22,613	33,029	10,691	18,852
19,703	23,137	24,109	35,174	6,286	10,859
20,593	24,854	20,939	30,922	2,161	3,382
22,226	26,844	19,270	29,569	715	1,053
22,717	27,588	17,239	26,446	287	297
22,014	27,072	16,303	25,458	140	125

[a] Excludes horsepower of spare parts.

[b] Excludes horsepower equivalent of 238,000 pounds of thrust output of 122 jet engines.

[c] Excludes horsepower equivalent of 4,151,000 pounds of thrust output of 1,208 jet engines.

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940–1945," p. 7.

TABLE 2–19. MILITARY AIRCRAFT ENGINE PRODUCTION, BY MANUFACTURER 1940–1945

(Number of Engines)

Manufacturer	TOTAL	1940	1941	1942	1943	1944	1945
TOTAL	812,614	22,667	58,181	138,089	227,116	256,911	109,650
Aircooled Motors, Inc.	6,384	—	2,204	446	691	2,443	600
General Motors Corp.							
Allison Division	69,998	1,143	6,448	14,905	21,093	20,303	6,106
Buick Motor Div.	74,422	—	—	8,401	24,626	30,550	10,845
Chevrolet Division	60,769	—	—	4,058	23,415	27,528	5,768
Continental Motors Corp. and subsidiaries	36,259	4,452	6,577	8,326	8,626	6,610	1,668
Dodge Division, Chrysler Corp.	18,413	—	—	—	—	6,053	12,360
Ford Motor Company	57,637	—	264	6,403	13,337	24,197	13,436
General Electric Co.	717	—	—	—	—	122	595
Jacobs Aircraft Engine Company	32,160	340	3,370	7,416	12,897	7,382	755
Kinner Motors, Inc.	3,317	509	896	1,479	433	—	—
Lycoming Division, AVCO	25,572	2,979	4,439	5,336	7,488	3,452	1,878
Menasco Manufacturing Company	597	162	422	13	—	—	—
Nash-Kelvinator Corp.	17,108	—	—	6	2,692	9,275	5,135
Naval Aircraft Factory	1,402	172	557	320	353	—	—
Packard Motor Car Co.	55,135	—	49	7,251	12,295	22,969	12,571
Pratt & Whitney Aircraft, United Aircraft Corp.	133,155	7,149	18,122	33,954	35,268	23,775	14,887
Ranger Aircraft Engines, Fairchild Engine & Airplane Corporation	14,365	377	1,243	3,580	6,722	2,346	97
Studebaker Corp.	63,789	—	—	6,091	22,926	27,920	6,852
Warner Aircraft Corp.	2,081	214	526	372	608	361	—
Waukesha Foundry Co.	45	—	—	—	25	20	—
Wright Aeronautical Corporation	139,289	5,170	13,064	29,732	33,621	41,605	16,097

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances 1940–1945," pp. 139–149.

TABLE 2–20. MILITARY AIRCRAFT ENGINE PRODUCTION, BY MANUFACTURER 1940–1945

(In Thousands of Horsepower[a])

Manufacturer	TOTAL	1940	1941	1942	1943	1944[b]	1945[c]
TOTAL	1,022,452	15,468	44,930	147,535	262,282	368,050	184,187
Aircooled Motors, Inc.	853	—	197	41	109	396	110
General Motors Corp.							
Allison Division	98,168	1,251	7,029	21,239	30,093	29,066	9,490
Buick Motor Div.	89,943	—	—	10,081	29,551	36,660	13,651
Chevrolet Division	76,672	—	—	4,768	28,099	33,328	10,477
Continental Motors Corp. and subsidiaries	8,068	533	914	1,210	1,646	2,617	1,148
Dodge Division, Chrysler Corporation	40,508	—	—	—	—	13,316	27,192
Ford Motor Company	115,234	—	488	12,806	26,674	48,394	26,872
Jacobs Aircraft Engine Company	10,721	86	884	2,058	4,214	3,097	382
Kinner Motors, Inc.	497	64	129	236	68	—	—
Lycoming Division, AVCO	5,566	322	904	1,517	1,785	691	347
Menasco Manufacturing Company	77	21	54	2	—	—	—
Nash Kelvinator Corp.	34,216	—	—	12	5,384	18,550	10,270
Naval Aircraft Factory	421	41	131	93	156	—	—
Packard Motor Car Co.	73,979	—	66	9,428	15,985	32,157	16,343
Pratt & Whitney Aircraft, United Aircraft Corp.	160,843	6,576	15,890	32,918	38,359	39,776	27,324
Ranger Aircraft Engines, Fairchild Engine & Airplane Corporation	3,715	66	235	916	1,586	862	50
Studebaker Corporation	76,546	—	—	7,309	27,511	33,504	8,222
Warner Aircraft Corp.	331	29	67	64	105	66	—
Waukesha Foundry Co.	23	—	—	—	13	10	—
Wright Aeronautical Corp.	226,071	6,479	17,942	42,837	50,944	75,560	32,309

[a] Horsepower used in most cases is takeoff horsepower. In a few instances, sea level horsepower has been substituted. Excludes horsepower of spare parts.

[b] Excludes horsepower equivalent of 238,000 pounds of thrust output of 122 jet engines.

[c] Excludes horsepower equivalent of 4,151,000 pounds of thrust output of 1,208 jet engines.

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances 1940–1945," pp. 151–163.

TABLE 2–21. DELIVERIES OF MILITARY AIRCRAFT AND AIRCRAFT ENGINES
U. S. ARMY
April 6, 1917–November 1, 1919

Aircraft		Aircraft Engines	
Manufacturer	Number of Aircraft	Manufacturer	Number of Aircraft Engines
TOTAL	13,894	TOTAL	41,953
Breese Aircraft Corporation	300	Aero Engineering	121
Canadian Aero Company	680	Canadian Aero Company	400
Curtiss Aeroplane & Motor Corp.	4,014	Curtiss Aeroplane & Motor Corp.	750
Dayton-Wright Aeroplane Company	3,506	Excelsior M. M. & S. Co.	451
Fisher Body Company	2,000	Ford Motor Company	3,950
		General Motors Corporation	2,543
Fowler Corporation	50	General Vehicle Company	61
Howell & Lesser	75	Hall-Scott Motor Car Company	1,255
LWF Engineering Company	131	LWF Engineering Company	94
Liberty Iron Works	200	Lincoln Motor Company	6,500
Packard Motor Car Company	25		
Springfield Aircraft Company	588	Nordyke & Marmon Motor Car Co.	2,000
St. Louis Aircraft Corporation	450	Packard Motor Car Company	6,630
Standard Aircraft Corporation	1,033	Sturtevant Aeroplane Company	73
Thomas-Morse Aircraft Corp.	599	Thomas-Morse Aircraft Corp.	69
U. S. Aircraft Company	50	Union Switch & Signal Company	2,585
Wright-Martin Aircraft Corp.	51		
Other[a]	142	Willys-Overland Company	8,500
		Wright-Martin Aircraft Corp.	5,816
		Other[b]	155

[a] Includes companies producing less than 25 aircraft during the period, e.g., Burgess Company, Gallaudet Aircraft Corporation, Heinrich Corporation, Lewis & Vought Corp., Glenn L. Martin Company, Ordnance Engineering Company, Sturtevant Aeroplane Company, Pacific Aero Products Company, Equipment Holding, Italian War Mission, Pigeon-Fraser, Schaefer & Sons, etc.

[b] Includes companies producing less than 50 aircraft engines during the period, e.g., Ordnance Engineering Company, Lawrence Aero-Engine Company, Standard Aircraft Corporation, Burgess Co., Gallaudet Aircraft Corporation, Duesenberg Motor Corp., Trego Motors Corporation, Equipment Holding, Italian War Mission, British War Mission, etc.

Source: Aeronautical Chamber of Commerce, "Aircraft Year Book," 1922, pp. 180–196.

TABLE 2–22. CONTROLLABLE AIRCRAFT PROPELLER SHIPMENTS, BY MONTHS 1940–1945

(Number of Propellers)

Month	1940	1941	1942	1943	1944	1945
TOTAL	14,290	39,123	106,136	213,937	243,741	96,490
January	648	2,111	6,588	12,209	22,593	15,898
February	812	1,912	5,245	12,703	22,363	15,449
March	883	2,524	6,883	14,413	22,142	15,803
April	895	2,419	8,374	15,717	21,433	14,466
May	885	2,612	8,154	15,947	21,973	13,071
June	1,165	2,829	9,266	16,875	21,780	10,273
July	1,422	3,106	9,603	19,310	19,200	8,380
August	1,260	3,436	9,591	20,266	21,000	2,989
September	1,298	4,170	9,910	20,413	19,646	18
October	1,821	4,449	10,963	22,275	17,490	—
November	1,551	4,413	10,005	21,345	17,344	27
December	1,650	5,142	11,554	22,464	16,777	116

Source: Civil Aeronautics Administraton, "U. S. Military Aircraft Acceptances 1940–1945," pp. 165–175.

TABLE 2–23. MILITARY AIRCRAFT JET ENGINES PRODUCED, BY MANUFACTURER 1944–1945

(In Thousands of Pounds of Thrust)

Manufacturer	TOTAL	1944	1945
TOTAL	4,389	238	4,151
Allison Division, General Motors Corporation	2,388	—	2,388
Chevrolet-Aviation Engine Plant Division	12	—	12
General Electric Company	1,989	238	1,751

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940–1945" pp. 161, 163.

TABLE 2–24. CONTROLLABLE AIRCRAFT PROPELLER SHIPMENTS, BY MANUFACTURER 1940–1945

(Number of Propellers)

Manufacturer	TOTAL	1940	1941	1942	1943	1944	1945
TOTAL	713,717	14,290	39,123	106,136	213,937	243,741	96,490
Aeroproducts	20,803	—	77	2,504	8,099	5,772	4,351
Canadian Prop, Ltd	12,497	—	—	1,025	4,956	5,496	1,020
Curtiss-Wright	146,142	3,194	8,174	26,861	42,088	45,614	20,211
Frigidaire	76,626	—	—	—	23,132	38,738	14,756
Hamilton Standard	237,161	11,096	30,872	61,018	65,398	49,661	19,116
Nash-Kelvinator	158,134	—	—	14,728	58,650	63,254	21,502
Remington Rand	62,354	—	—	—	11,614	35,206	15,534

Source: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances 1940–1945," pp. 165–175.

TABLE 2–25. NAVAL AIRCRAFT MANUFACTURING LEAD TIME[a], 1953

Aircraft Class	Range of Lead Time (in months)
Attack	18–24
Fighter	18–24
Helicopter	18
Patrol	19–21
Search	18
Trainer	18

[a] For an aircraft already in production; time elapsing between placement of re-order and delivery of first airplane.

Source: Eighty-Third Congress, House of Representatives, Hearings Before the Subcommittee on Appropriations on the Department of the Navy Appropriations for 1954, p. 761.

TABLE 2-26. CONSUMPTION OF SELECTED MATERIALS BY AIRCRAFT AND PARTS INDUSTRY, 1947–1951

(Short Tons)

Year	All Metal-working Industries[a]	Aircraft and Parts Industry				Aircraft and Parts As Percent Of All Metal-working
		TOTAL	Aircraft	Aircraft Engines	Aircraft Equipment n.e.c.	
CARBON STEEL						
1947	36,411,380[b]	22,934	12,189	7,809	2,936	.1
1949	36,707,265	51,279	17,966	19,524	13,789	.1
1950	43,025,011	72,474	[c]	[c]	[c]	.2
1951	47,381,914	120,608	[c]	[c]	[c]	.3
STEEL ALLOYS						
1947	2,670,257[d]	24,017	5,931	15,441	2,645	.9
1949	2,789,855[d]	41,464	8,338	24,297	8,829	1.5
1950	3,853,858[d]	53,716	[c]	[c]	[c]	1.4
1951	4,563,142	112,672	[c]	[c]	[c]	2.5
ALUMINUM						
1947	461,001[e]	33,936	27,441	5,378	N.A.	7.4
1949	460,315	40,098	29,164	5,602	N.A.	8.7
1950	712,233	59,884	[c]	[c]	[c]	8.4
1951	662,844	116,529	[c]	[c]	[c]	17.6
COPPER AND COPPER-BASE ALLOYS						
1947	942,902[b]	632	N.A.	N.A.	N.A.	.1
1949	1,027,118	N.A.	N.A.	N.A.	N.A.	N.A.
1950	1,334,222	3,102	N.A.	N.A.	N.A.	.2
1951	1,393,821	9,705	N.A.	N.A.	N.A.	.7

N.A.—Not available.

[a] Data in this table do not include consumption by metals of metal mills engaged in fabricating metal products, or by non-manufacturing activities, such as construction, transportation, etc.

[b] Includes purchases and interplant transfers, but excludes data on production and consumption within the same establishment. Latter data, however, have been included in totals for 1949, 1950, and 1951. In 1949, quantity so included was 276,070 short tons; in 1950, 303,758. Thus, 1947 percentage is not strictly comparable with those of succeeding years.

[c] Withheld for security reasons on the advice of the Bureau of the Budget.

[d] Includes purchases and interplant transfers, but excludes data on production and consumption within the same establishment. Latter data, however, have been included in 1951 total. It is estimated that total tonnages produced and consumed did not exceed 2 percent of the tonnage purchased or received through transfer in either 1949 or 1950.

[e] Includes purchases and interplant transfers, but excludes data on production and consumption within the same establishment. Latter data in the amount of 43,431 and 25,298 short tons included in 1950 and 1949 totals respectively.

[f] Includes purchases and interplant transfers, but excludes data on production and consumption within the same establishment. Latter data in the amount of 205,218 and 122,144 short tons included in 1950 and 1949 totals respectively.

Source: Bureau of the Census, 1951 Annual Survey of Manufactures, "Metals Consumed by Manufacturers of Metal Products for Selected Industries," Advance Report, Series MAS-51-5.

TABLE 2-27. LOCATION OF AIRCRAFT AND ENGINE PRODUCTION DURING WORLD WAR I

April 6, 1917–November 1, 1918

Location	Airplanes			Engines		
	Number Delivered	Total Disbursement (Million Dollars)	Percent of Disbursement	Number Delivered	Total Disbursement (Million Dollars)	Percent of Disbursement
TOTAL[a]	13,111	$112.0	100.1	41,576	$244.6	100.1
Boston	2	[b]	—	73	.3	.1
Springfield, Mass.	588	3.5	3.1	—	—	—
Providence	4	.1	.1	—	—	—
New Haven	8	.2	.1	—	—	—
New York	1,224	17.6	15.5	6,057	55.2	22.6
Ithaca, N. Y.	599	3.1	2.7	69	.3	.1
Buffalo	4,014	29.4	25.7	750	.6	.3
Pittsburgh	—	—	—	2,585	10.1	4.1
Dayton	3,506	31.5	27.6	—	—	—
Elyria, Ohio	10	.8	.7	—	—	—
Toledo	—	—	—	8,500	21.0	8.6
Indianapolis	—	—	—	2,040	23.0	9.4
Detroit	2,025	20.7	18.2	19,623	127.8	52.1
Chicago	—	—	—	453	.3	.1
St. Louis	450	2.1	1.9	—	—	—
Spokane	50	.3	.3	—	—	—
Portland, Ore.	300	.6	.5	—	—	—
Sacramento	200	1.0	.9	—	—	—
San Francisco	50	.3	.3	1,255	2.9	1.2

[a] Includes a small undistributed amount.

[b] Less than $50,000.

Source: Cunningham, William G., "The Aircraft Industry, A Study in Industrial Location," 1951, p. 202.

CHAPTER III

LABOR

In June 1950, when the Communists attacked in Korea, national employment was at unprecedentedly high peacetime levels. The reserve manpower pool was low, and the civilian economy was booming.

The North Korean attack resulted in a sharp acceleration in preparedness efforts. The armed forces rapidly increased orders for military aircraft. To meet these high demands, the aircraft industry was called upon for the second time in a decade to enter upon a vast manpower expansion program.

Peaks and Valleys in Aircraft Manpower

Over the years, employment in the aircraft industry has fluctuated greatly. At the start of the first World War, total employment was only 200. Four years later, when America was helping to win the "war to end wars," employment had skyrocketed to an estimated 50,000 men and women. By 1919, it was down to 4,200 and by 1921 to 2,000.

This pattern was repeated several times during the following 32 years. The graph of aircraft employment shows a peak in 1929, when 18,600 persons were employed—and a valley in 1933 when only 9,600 were building planes.

During World War II, more Americans worked to build military aircraft than had been engaged in any single manufacturing effort in history.

In 1943, 1,342,500 persons were employed directly by aircraft manufacturers—and more than 650,000 worked for aircraft subcontractors and suppliers. Between January 1940 and the end of 1943, aircraft prime contractors' employment levels increased 17-fold.

This great work force produced more than 96,000 military aircraft in 1944—more military planes than had been built by any country in one year in world history, and more than had been built in the entire world prior to 1940.

In those war years, almost four of every ten persons in the industry were women. One of every 22 persons was an engineer.

The industry rose from 41st in rank among U.S. manufacturing employers to first.

World War II Demobilization

Then came VE-Day—followed several months later by the atom-

bombing of Hiroshima and Nagasaki, and the Japanese capitulation.

The lack of a long-range aircraft procurement program led to the dismantling of the world's largest production machine—and the disintegration of its trained manpower teams.

In 1946, employment in the industry reached its postwar valley. A highly-trained nucleus of engineers and technicians staffed the plants—but military orders reached dangerously low levels and the industry as a whole suffered heavy losses both in 1946 and 1947.

As a result of supplemental appropriations in 1948—down payment on a 70-group Air Force—aircraft employment began to expand; but appropriations in fiscal 1949 and 1950 again were reduced to levels capable of supporting only a 48-group force. Even so, by June 1950, aircraft and parts employment had moved from 16th to 11th among U.S. manufacturers.

Aircraft Labor Shortages

Generally speaking, the industry experienced no severe shortages of labor of lower skills during the Korean buildup—except in critical areas which had comparatively tight labor situations prior to the outbreak of the war (for example, San Diego, Wichita and Hartford).

The acute manpower shortages developed in the highly-skilled lines: engineers, scientists, skilled craftsmen, technicians. Some shortages still persist in these fields.

Supply of Engineers Dwindles

The greatest long-range manpower problem of the aircraft industry is the acute shortage of qualified engineers and scientists. Today, one in 11 aircraft employees is an engineer. This proportion grows larger constantly, as the need for research accelerates and increasingly complex military aircraft require greater numbers of engineering man hours.

With requirements mounting, an alarming factor in the engineering picture is the prospective decline in the rate of graduating engineering students. In 1949, for example, 47,000 engineers were graduated from the nations' engineering schools. In 1954, less than one-half this number are expected to be graduated.

Statistics on Average Aircraft Worker

In the summer of 1953, the average worker in the aircraft industry worked 41.5 hours per week, and his weekly earnings were $82.17. In most cases, rate of pay was based on a job classification analysis which set a rate-range for each of the thousands of different jobs existing in the industry. Employees can advance within the rate-ranges through merit or length of service, or both.

Most employees receive a paid vacation and other fringe benefits, such as seven or eight paid holidays per year, insurance and sick benefits, and pension plans.

Only a few aircraft plants are unorganized. Most workers are affiliated with the International Association of Machinists (which entered the aircraft industry in 1934) or the United Automobile Workers (which received a charter covering aircraft workers in 1937).

TABLE 3–1. CENSUS FIGURES ON EMPLOYMENT IN THE AIRCRAFT INDUSTRY 1914–1952

Year	TOTAL	Salaried Officers and Employees[a]	Production Workers[b]
1914	222	54	168
1919	4,202	659	3,543
1921	1,952	557	1,395
1923	3,496	595	2,901
1925	N.A.	N.A.	2,701
1927	5,486	1,064	4,422
1929	18,620	3,910	14,710
1931	N.A.	N.A.	9,870
1933	9,626	1,810	7,816
1935	14,931	3,547	11,384
1937	31,920	7,917	24,003
1937[c]	N.A.	N.A.	30,384
1939	63,994	15,233	48,761
1947	219,611	57,015	162,596
1949	262,643	65,899	196,744
1950	289,545	78,036	211,509
1951	488,179	125,491	362,688
1952	688,889	181,822	507,067

N.A.—Not available.

[a] Includes proprietors and firm members in earlier years.

[b] Before 1947 the figures show "Wage earners." In 1947 the definition was changed to "Production and related workers."

[c] This line and all following lines include data for aircraft engine manufacturers which are not available for prior years.

Sources: Bureau of the Census, "Census of the United States, Manufactures;" 1919, 1929, 1939.
Bureau of the Census, "Biennial Census of Manufactures," 1921–1937.
Bureau of the Census, "Census of Manufactures, 1947."
Bureau of the Census, "Annual Survey of Manufactures," 1949 and 1950, 1951, 1952.
Bureau of the Census; unpublished data.

TABLE 3–2. AIRCRAFT AND TOTAL MANUFACTURING EMPLOYMENT, 1914 TO DATE

Year or Month	Aircraft Employment (in thousands)	Total Manufacturing Employment (in thousands)	Aircraft as Percent of Total Manufacturing
1914	.2	7,514	[a]
1919	4.2	9,837	[a]
1921	2.0	7,557	[a]
1929	18.6	9,660	.2
1933	9.6	6,558	.2
1939	64.0	9,527	.7
Dec. 1941	423.0	13,817	3.1
Nov. 1943	1,342.5	17,858	7.5
Aug. 1945	351.4	15,343	2.2
Including subcontractors			
Dec. 1941	567.0	13,817	4.1
Nov. 1943	2,101.6	17,858	11.8
Aug. 1945	519.9	15,343	3.4
Mar. 1946	219.1	13,510	1.6
June 1950	262.5	14,666	1.8
July 1953	748.8	17,253	4.3

[a] Less than .05 percent.

Sources: 1914–1939: Bureau of the Census; "Census of the United States, Manufactures;" 1919, 1929, 1939. "Biennial Census of Manufactures," 1921–1937.

1941–1945: (Aircraft employment): Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940–1945," pp. 10, 11. (Total manufacturing employment): Bureau of Labor Statistics, "Employment and Payrolls" (Monthly).

1946–1953: Bureau of Labor Statistics: "Employment and Payrolls" (Monthly).

TABLE 3–3. GEOGRAPHICAL DISTRIBUTION OF EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY, 1939 TO DATE

(In Percent of Totals)

Date	TOTAL	East Coast	Central	West Coast
1939[a]	100.0	54.5	4.5	41.0
Nov. 1943[b]	100.0	30.8	43.5	25.7
June 1950[c]	100.0	32.0	28.8	39.2
Feb. 1953[c]	100.0	29.3	40.1	30.6

[a] Wage earners in the aircraft, engine, propeller and parts industry, according to the Census of Manufactures.

[b] Total employment in the aircraft, engine, propeller, and parts industry according to figures collected by the Bureau of Labor Statistics and published by Civil Aeronautics Administration.

[c] Estimated by the Bureau of Employment Security on the basis of all workers covered by Unemployment Insurance Laws in the aircraft, engine, propeller, and parts industry.

Sources: 1939: Bureau of the Census, "Census of Manufactures, 1939."

1943: Civil Aeronautics Administration, "U. S. Military Aircraft Acceptances, 1940–1945," pp. 188–193.

1950 and 1953: U. S. Department of Labor, Bureau of Employment Security.

TABLE 3-4. EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY JANUARY 1950 TO DATE
(Thousands of Employees)

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1950					
Jan.	258.8	171.4	51.5	8.3	27.6
Feb.	258.5	170.6	51.6	8.3	28.0
Mar.	259.0	170.9	51.9	8.2	28.0
Apr.	259.8	172.2	52.0	8.1	27.5
May	260.1	173.2	51.9	8.1	26.9
June	262.5	174.6	53.3	8.0	26.6
July	265.4	176.8	54.1	7.9	26.6
Aug.	278.9	187.8	55.3	7.7	28.1
Sept.	292.1	200.0	53.6	8.4	30.1
Oct.	311.4	209.2	61.3	8.7	32.2
Nov.	329.9	221.9	64.7	9.0	34.3
Dec.	345.6	232.6	67.9	9.2	35.9
1951					
Jan.	360.6	241.0	71.6	9.5	38.5
Feb.	389.5	262.8	75.9	9.6	41.2
Mar.	407.0	276.0	78.6	9.7	42.7
Apr.	422.3	285.9	82.3	10.4	43.7
May	435.5	293.8	85.8	10.7	45.2
June	458.8	309.7	90.8	10.6	47.7
July	479.1	324.8	94.3	10.5	49.5
Aug.	494.9	335.9	97.2	10.6	51.2
Sept.	500.8	335.8	100.7	11.5	52.8
Oct.	504.2	345.0	91.7	11.7	55.8
Nov.	547.3	369.6	107.9	12.0	57.8
Dec.	562.9	379.0	112.6	12.3	59.0
1952					
Jan.	576.1	383.7	117.5	12.6	62.3
Feb.	593.4	392.8	122.9	12.8	64.9
Mar.	600.7	396.3	124.2	13.0	67.2
Apr.	609.5	401.2	125.7	13.3	69.3
May	618.7	405.8	127.8	13.5	71.6
June	634.7	412.9	131.5	13.9	76.4
July	652.0	423.3	134.6	13.9	80.3

TABLE 3-4. EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY JANUARY 1950 TO DATE—*Continued*
(Thousands of Employees)

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1952					
Aug.....	669.1	432.9	137.9	14.2	84.1
Sept.....	654.9	408.7	143.2	14.5	88.5
Oct.....	684.3	430.2	147.5	14.8	91.8
Nov.....	694.5	434.0	150.2	15.2	95.1
Dec.....	711.4	444.5	153.9	15.7	97.3
1953					
Jan.....	721.4	447.8	158.1	16.3	99.2
Feb.....	729.2	448.1	163.7	16.6	100.8
Mar:.....	735.0	449.2	165.6	16.5	103.7
Apr.....	727.3	446.9	159.2	16.5	104.7
May.....	728.4	445.6	161.3	16.4	105.1
June.....	729.9	444.6	162.3	16.4	106.6
July.....	743.2	449.6	169.9	16.3	107.4
Aug.....	748.8	454.9	168.8	16.2	108.9

Source: Bureau of Labor Statistics. This is a series that has been revised in 1953. It replaces figures previously published.

TABLE 3-5. EMPLOYMENT IN THE AIRCRAFT AND PARTS INDUSTRY. 1939-1952
(Thousands of Employees)

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1939	63.2	45.1	11.3	N.A.	N.A.
1940	148.6	101.8	31.4	N.A.	N.A.
1941	347.1	234.6	75.3	N.A.	N.A.
1942	831.7	549.6	192.0	N.A.	N.A.
1943	1,345.6	882.1	314.9	N.A.	N.A.
1944	1,296.6	815.5	339.7	N.A.	N.A.
1945	788.1	489.9	210.9	N.A.	N.A.
1946	237.3	159.0	49.9	N.A.	N.A.
1947	239.3	158.5	50.1	7.8	23.0
1948	237.7	158.0	48.6	7.7	23.3
1949	264.1	175.3	53.5	8.2	27.0
1950	281.8	188.4	55.8	8.3	29.3
1951	463.6	313.3	90.8	10.8	48.8
1952	641.6	413.9	134.7	14.0	79.1

N.A.—Not available.
Source: Bureau of Labor Statistics. This is a series that has been revised in 1953. It replaces figures previously published.

TABLE 3-6. EMPLOYMENT BY AIRCRAFT PRIME AND SUBCONTRACTORS SECOND WORLD WAR, 1940–1945
(Thousands of Employees)

Year (End of Month)	GRAND TOTAL[a]	ON SITE					Total Subcontracting (est.)	Government Furnished Equipment (est.)
		Total	Airframes	Engines	Propellers	Gliders		
1940								
Jan....	98	78	59	16	3	—	5	15
Feb....	104	82	62	17	3	—	6	16
Mar....	110	87	65	19	3	—	6	17
Apr....	120	95	71	21	3	—	7	18
May....	132	104	77	23	4	—	9	19
June....	144	115	86	25	4	—	9	20
July....	158	126	94	28	4	—	11	21
Aug....	171	135	101	30	4	—	14	22
Sept....	185	146	109	32	5	—	16	23
Oct.....	198	156	118	33	5	—	18	24
Nov....	213	167	125	36	6	—	21	25
Dec....	228	179	134	39	6	—	23	26
1941								
Jan.....	253	194	146	41	7	—	27	32
Feb....	267	205	154	44	7	—	29	33
Mar....	282	216	161	47	8	—	31	35
Apr....	302	231	172	51	8	—	33	38
May....	322	246	183	54	9	—	36	40
June....	352	269	200	60	9	—	39	44
July....	384	294	219	65	10	—	42	48
Aug....	418	319	239	70	10	—	47	52
Sept....	446	341	256	74	11	—	49	56
Oct.....	490	371	277	83	11	—	58	61
Nov....	517	391	292	87	12	—	61	65
Dec....	567	423	313	97	13	—	73	71
1942								
Jan.....	619	461	342	104	15	—	81	77
Feb....	683	502	369	117	16	—	96	85
Mar....	735	538	390	129	19	—	105	92
Apr....	793	573	413	139	21	—	121	99
May....	848	611	439	149	23	—	131	106

TABLE 3–6. EMPLOYMENT BY AIRCRAFT PRIME AND SUBCONTRACTORS SECOND WORLD WAR, 1940–1945—*Continued*

(Thousands of Employees)

Year (End of Month)	GRAND TOTAL[a]	ON SITE					Total Subcontracting (est.)	Government Furnished Equipment (est.)
		Total	Airframes	Engines	Propellers	Gliders		
1942								
June....	930	655	471	157	25	2	151	115
July....	1,000	699	505	163	27	4	166	124
Aug....	1,099	759	553	171	29	6	191	136
Sept....	1,180	805	590	176	31	8	214	146
Oct.....	1,280	862	635	185	33	9	243	158
Nov....	1,384	920	681	196	34	9	274	171
Dec....	1,496	983	730	205	36	12	309	181
1943								
Jan.....	1,609	1,041	771	219	38	13	347	198
Feb....	1,681	1,087	800	232	40	14	363	207
Mar....	1,739	1,123	820	245	42	16	377	214
Apr....	1,790	1,154	839	256	44	15	389	220
May....	1,837	1,182	856	264	47	15	399	226
June....	1,895	1,219	881	274	49	15	410	233
July....	1,942	1,249	901	283	50	15	421	239
Aug....	1,981	1,273	907	297	53	16	432	244
Sept....	2,032	1,306	925	311	55	15	444	250
Oct.....	2,074	1,328	931	326	55	16	454	255
Nov....	2,102	1,343	937	336	54	16	461	258
Dec....	2,079	1,327	923	333	55	16	455	255
1944								
Jan.....	2,080	1,324	913	338	57	16	457	254
Feb....	2,063	1,312	899	340	57	16	454	252
Mar....	2,018	1,283	875	336	57	15	444	247
Apr....	1,987	1,261	856	335	56	14	438	243
May....	1,957	1,241	841	332	55	13	432	239
June....	1,910	1,210	811	332	55	12	422	233
July....	1,883	1,193	797	330	54	12	418	230
Aug....	1,813	1,153	770	317	53	13	404	222
Sept....	1,741	1,108	741	300	54	13	388	213
Oct.....	1,691	1,077	721	290	52	14	376	208

TABLE 3-6. EMPLOYMENT BY AIRCRAFT PRIME AND SUBCONTRACTORS SECOND WORLD WAR, 1940–1945—*Continued*
(Thousands of Employees)

Year (End of Month)	GRAND TOTAL[a]	ON SITE					Total Subcontracting (est.)	Government Furnished Equipment (est.)
		Total	Airframes	Engines	Propellers	Gliders		
1944								
Nov....	1,672	1,065	715	285	51	14	372	205
Dec....	1,667	1,061	713	284	49	15	371	205
1945								
Jan.....	1,684	1,073	724	286	48	15	374	207
Feb....	1,677	1,068	721	285	47	15	374	205
Mar....	1,643	1,047	704	281	47	15	366	202
Apr....	1,586	1,011	679	271	46	15	354	195
May....	1,464	936	622	256	43	15	324	180
June....	1,326	859	566	238	40	15	280	163
July....	1,237	807	532	225	36	14	256	152
Aug....	520	351	255	81	10	5	91	63
Sept....	338	247	177	59	7	4	42	41
Oct.....	278[b]	208	161	38	6	3	32	34
Nov....	252[b]	191	151	33	6	1	28	31
Dec....	242[b]	186	150	30	5	1	25	30

est.—Estimated.

[a] Includes "Special Purpose" and "Modification Centers."

[b] Mid-month employment.

Note: These are the best available figures on how many people were actually engaged in aircraft production during the Second World War. The "On Site" figures are lower than the totals given under "Employment in the Aircraft and Parts Industry" probably because employment in plants which produced parts but which were not prime contractors is not included. The "Grand Total," on the other hand, includes estimates for the aircraft emloyment of all manufacturers contributing to aircraft production.

Source: Civil Aeronautics Administration; "U. S. Military Aircraft Acceptances, 1940–1945," pp. 10 and 11.

TABLE 3-7. PRODUCTION WORKERS IN THE AIRCRAFT AND PARTS INDUSTRY JANUARY 1950 TO DATE
(Thousands of Production Workers)

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1950					
Jan.....	189.4	126.3	36.8	5.5	20.8
Feb.....	189.0	125.7	36.7	5.5	21.1
Mar.....	188.7	125.4	36.9	5.5	20.9
Apr.....	189.5	126.5	37.0	5.4	20.6
May.....	189.8	127.5	36.9	5.4	20.0
June.....	191.1	128.1	37.9	5.3	19.8
July.....	192.4	129.2	38.3	5.2	19.7
Aug.....	203.6	137.9	39.8	5.0	20.9
Sept.....	213.9	147.6	38.1	5.6	22.6
Oct.....	229.1	154.6	44.5	5.8	24.2
Nov.....	244.0	164.6	47.2	6.0	26.2
Dec.....	256.7	173.3	49.4	6.2	27.8
1951					
Jan.....	268.9	180.5	52.2	6.3	29.9
Feb.....	292.8	199.0	54.9	6.6	32.3
Mar.....	304.0	207.5	56.1	6.8	33.6
Apr.....	314.0	214.5	57.9	7.5	34.1
May.....	323.1	219.8	60.3	7.6	35.4
June.....	338.0	229.2	63.6	7.6	37.6
July.....	352.3	240.3	65.5	7.4	39.1
Aug.....	363.4	247.5	67.8	7.5	40.6
Sept.....	366.0	245.8	70.1	8.0	42.1
Oct.....	367.4	252.6	62.8	8.2	43.8
Nov.....	400.7	272.0	75.0	8.4	45.3
Dec.....	411.8	279.0	78.3	8.7	45.8
1952					
Jan.....	422.4	283.5	82.1	8.9	47.9
Feb.....	433.8	288.3	86.4	9.1	50.0
Mar.....	439.1	291.3	87.3	9.3	51.2
Apr.....	443.8	293.3	88.1	9.5	52.9
May.....	453.5	299.1	90.0	9.6	54.8
June.....	466.1	303.9	93.4	10.0	58.8
July.....	476.1	309.3	95.5	10.0	61.3

TABLE 3–7. PRODUCTION WORKERS IN THE AIRCRAFT AND PARTS INDUSTRY JANUARY 1950 TO DATE—*Continued*
(Thousands of Production Workers)

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1952					
Aug.....	490.3	317.3	98.4	10.2	64.4
Sept.....	474.2	292.7	103.0	10.4	68.1
Oct.....	501.3	313.2	106.5	10.7	70.9
Nov.....	509.7	316.4	108.6	11.1	73.6
Dec.....	523.6	324.9	111.7	11.6	75.4
1953					
Jan.....	530.7	326.9	115.0	12.1	76.7
Feb.....	538.1	329.3	118.4	12.3	78.1
Mar.....	542.3	330.2	119.1	12.3	80.7
Apr.....	532.8	327.2	112.6	12.2	80.8
May.....	532.3	324.8	114.5	12.1	80.9
June.....	534.8	321.8	118.3	12.1	82.6
July.....	538.0	323.2	120.0	12.0	82.8
Aug.....	543.3	327.5	119.9	11.7	84.2

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–8. AVERAGE WEEKLY HOURS IN AIRCRAFT AND PARTS PLANTS 1939–1952

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1939	N.A.	N.A.	44.6	N.A.	N.A.
1940	N.A.	N.A.	46.6	N.A.	N.A
1941	N.A.	N.A.	47.6	N.A.	N.A.
1942	N.A.	N.A.	49.7	N.A.	N.A.
1943	N.A.	N.A.	48.6	N.A.	N.A
1944	N.A.	N.A.	47.7	N.A.	N.A.
1945	N.A.	N.A.	43.2	N.A.	N.A.
1946	N.A.	N.A.	41.6	N.A.	N.A.
1947	39.9	39.7	39.9	41.5	40.1
1948	41.0	41.1	40.9	39.7	41.0
1949	40.6	40.5	40.7	41.0	40.0
1950	41.6	41.4	42.1	42.4	41.7
1951	43.8	43.3	45.4	46.2	43.7
1952	43.0	42.6	43.9	45.0	43.2

N. A.—Not available.
Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3-9. AVERAGE WEEKLY HOURS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1950					
Jan.....	40.7	40.7	40.1	42.0	40.9
Feb.....	40.7	40.6	40.7	41.6	41.0
Mar.....	40.5	40.3	41.1	40.2	40.8
Apr.....	40.3	40.2	40.7	40.3	40.4
May.....	40.8	40.6	41.6	39.1	40.9
June.....	40.7	40.5	41.5	40.2	40.9
July.....	41.2	40.8	42.7	42.2	41.0
Aug.....	42.4	42.6	42.1	44.4	40.8
Sept.....	42.7	42.7	43.8	43.9	39.7
Oct.....	41.9	42.1	39.7	44.6	43.6
Nov.....	42.4	41.5	45.0	43.3	43.6
Dec.....	43.3	42.6	44.8	45.9	44.6
1951					
Jan.....	43.7	43.1	45.1	45.3	44.8
Feb.....	43.4	42.7	45.3	46.3	44.1
Mar.....	44.0	43.5	45.7	46.3	44.2
Apr.....	44.1	43.5	46.0	46.9	44.1
May.....	44.0	43.3	46.2	46.0	43.9
June.....	44.0	43.3	46.3	47.3	43.5
July.....	43.8	43.4	45.7	48.1	42.6
Aug.....	43.6	43.3	44.8	47.5	42.7
Sept.....	43.9	43.7	44.8	45.2	43.4
Oct.....	43.2	43.1	43.4	44.8	43.6
Nov.....	43.8	43.5	45.3	45.1	43.3
Dec.....	44.1	43.5	45.8	45.4	44.4
1952					
Jan.....	43.3	42.3	45.9	45.3	44.0
Feb.....	43.2	42.7	44.8	44.8	43.2
Mar.....	42.9	42.3	44.8	45.2	42.9
Apr.....	42.0	41.7	42.7	44.5	42.0
May.....	42.8	42.5	43.6	45.0	43.1
June.....	42.7	42.4	43.2	45.5	43.1
July.....	42.6	42.3	43.2	45.4	42.9
Aug.....	42.3	42.4	42.0	45.1	41.9

TABLE 3-9. AVERAGE WEEKLY HOURS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE—*Continued*

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1952					
Sept.....	43.6	43.8	43.3	45.1	43.2
Oct.....	43.0	42.5	44.0	43.5	43.6
Nov.....	43.1	42.8	43.6	45.5	43.4
Dec.....	43.9	43.3	45.4	45.2	44.3
1953					
Jan.....	43.3	42.6	45.1	44.7	43.4
Feb.....	43.0	42.3	44.3	44.0	43.7
Mar.....	42.3	41.5	43.7	41.7	43.8
Apr.....	42.0	41.4	42.7	41.3	43.3
May.....	41.7	41.1	42.9	41.3	42.5
June.....	41.2	40.7	41.6	41.0	42.4
July.....	41.5	40.8	42.9	41.5	42.0

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3-10. PRODUCTION WORKERS IN THE AIRCRAFT AND PARTS INDUSTRY 1939–1952
(Thousands of Production Workers)

Monthly Average for the Year	TOTAL	Aircraft	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1939	49.2	34.5	9.5	N.A.	N.A.
1940	117.0	78.4	26.6	N.A.	N.A.
1941	275.9	181.9	65.2	N.A.	N.A.
1942	669.0	429.5	168.8	N.A.	N.A.
1943	1,080.4	685.0	279.8	N.A.	N.A.
1944	1,006.9	609.8	291.4	N.A.	N.A.
1945	585.0	356.7	165.5	N.A.	N.A.
1946	159.5	111.8	34.1	N.A.	N.A.
1947	175.1	116.1	36.6	5.1	17.2
1948	173.6	116.1	35.0	5.1	17.3
1949	194.7	130.8	38.6	5.5	19.8
1950	206.4	138.9	40.0	5.5	22.1
1951	341.9	232.3	63.7	7.6	38.3
1952	469.5	302.8	95.9	10.0	60.8

N.A.—Not available.
Source: U. S. Department of Labor, Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–11. CENSUS FIGURES ON SALARIES AND WAGES IN THE AIRCRAFT INDUSTRY 1914–1952

(Thousands of Dollars)

Year	TOTAL	Salaries	Wages of Production Workers
1914	$ 196	$ 61	$ 135
1919	6,908	2,001	4,907
1921	3,235	1,033	2,202
1923	6,160	1,638	4,522
1925	N.A.	N.A.	4,222
1927	9,146	2,289	6,857
1929	31,448	9,524	21,924
1931	N.A.	N.A.	15,481
1933	13,824	3,516	10,308
1935	21,475	6,582	14,893
1937	46,867	13,514	33,353
1937[a]	N.A.	N.A.	43,827
1939	108,286	30,798[b]	77,488
1947	703,693	227,396[b]	476,297
1949	956,189	311,821[b]	644,368
1950	1,132,017	371,773[b]	760,244
1951	2,102,913	642,821[b]	1,460,092
1952	3,140,534	1,003,510[b]	2,137,024

N.A.—Not available.

[a] This line and all following lines include data for aircraft engine manufacturers which are not available for prior years.

[b] In recent years "salaries" include some payments to employees in construction, distribution, etc.

Sources: Bureau of the Census, "Census of the United States, Manufactures": 1919, 1929, 1939.
Bureau of the Census, "Biennial Census of Manufactures," 1921–1937.
Bureau of the Census, "Census of Manufactures, 1947."
Bureau of the Census, "Annual Survey of Manufactures," 1949 and 1950, 1951, 1952.
Bureau of the Census; unpublished data.

TABLE 3-12. AVERAGE WEEKLY EARNINGS IN AIRCRAFT AND PARTS PLANTS 1939-1952

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1939	N.A.	N.A.	$36.93	N.A.	N.A.
1940	N.A.	N.A.	38.82	N.A.	N.A.
1941	N.A.	N.A.	47.65	N.A.	N.A.
1942	N.A.	N.A.	60.14	N.A.	N.A.
1943	N.A.	N.A.	61.24	N.A.	N.A.
1944	N.A.	N.A.	62.68	N.A.	N.A.
1945	N.A.	N.A.	55.34	N.A.	N.A.
1946	N.A.	N.A.	55.66	N.A.	N.A.
1947	$54.98	$53.99	56.30	$59.68	$56.50
1948	61.21	60.21	63.40	62.13	63.59
1949	63.62	62.69	65.24	66.83	68.08
1950	68.39	67.15	71.40	73.90	70.81
1951	78.40	75.78	85.81	89.17	78.66
1952	81.70	79.66	86.92	92.25	81.22

N.A.—Not available.

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3-13. APPRENTICES AND TRAINEES IN AIRCRAFT ASSEMBLY AND ENGINE PLANTS, APRIL-SEPTEMBER 1952

Type of Plant	Number of Plants Surveyed	TOTAL NUMBER IN TRAINING PROGRAM	Apprentices				Other Trainees
			Total	Tool & Die Makers	Machinists	Other	
Aircraft Assembly....	37	24,954	642	90	183	369	24,312
Aircraft Engines.....	49	2,337	989	363	85	541	1,348

Source: U. S. Department of Labor, Bureau of Apprenticeship, "Training Activities in Aircraft Establishments," November 24, 1952, pp. 7, 9.

TABLE 3–14. AVERAGE WEEKLY EARNINGS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1950					
Jan.....	$65.20	$64.63	$65.00	$68.88	$67.40
Feb.....	65.69	65.00	66.34	70.18	67.81
Mar.....	65.29	64.36	66.99	66.65	67.97
Apr.....	64.96	64.24	66.10	67.06	67.06
May.....	65.61	64.68	68.35	63.85	67.73
June.....	65.32	64.48	67.85	67.25	67.98
July.....	66.54	64.99	70.92	71.87	69.04
Aug.....	68.94	68.29	70.94	78.68	68.22
Sept.....	71.18	70.50	74.59	77.62	67.53
Oct.....	70.18	69.17	69.48	81.17	77.08
Nov.....	71.78	68.72	80.82	80.67	75.91
Dec.....	75.08	72.08	83.01	88.64	79.57
1951					
Jan.....	76.91	74.13	82.98	86.98	80.19
Feb.....	75.95	73.44	83.35	89.82	78.06
Mar.....	77.88	75.26	86.37	90.29	79.56
Apr.....	77.62	74.39	86.94	90.52	79.38
May.....	77.88	74.91	86.86	87.86	78.58
June.....	77.88	74.91	87.97	90.82	77.43
July.....	77.96	75.95	86.37	92.35	75.83
Aug.....	77.61	75.78	84.22	90.73	76.01
Sept.....	79.46	77.79	85.57	87.24	78.12
Oct.....	78.19	76.29	83.33	86.46	79.35
Nov.....	79.72	77.87	86.98	87.49	78.12
Dec.....	80.70	78.30	88.39	88.98	81.25
1952					
Jan.....	80.11	76.99	88.59	88.79	80.96
Feb.....	80.35	78.57	85.57	87.36	79.92
Mar.....	80.65	78.68	87.36	91.30	79.79
Apr.....	78.12	76.73	81.98	89.45	78.54
May.....	80.46	78.63	85.46	92.70	81.03
June.....	80.28	78.44	85.54	93.73	80.17
July.....	80.51	78.68	85.54	93.52	79.37
Aug.....	79.95	79.29	82.32	92.91	77.10

TABLE 3-14. AVERAGE WEEKLY EARNINGS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE—*Continued*

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1952					
Sept.....	$84.15	$83.22	$87.03	$94.71	$82.08
Oct.....	83.42	81.18	88.44	89.18	83.28
Nov.....	84.48	82.60	88.94	95.10	83.33
Dec.....	86.04	84.00	92.16	94.02	85.94
1953					
Jan.....	85.73	83.50	92.00	92.08	84.63
Feb.....	85.14	82.91	89.49	91.08	85.65
Mar.....	84.18	82.17	87.84	83.82	86.29
Apr.....	83.16	82.17	85.40	83.84	85.10
May.....	82.57	80.97	85.80	83.43	83.30
June.....	81.58	79.77	84.03	84.46	83.53
July.....	82.17	79.97	87.09	84.66	83.16

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3-15. AVERAGE HOURLY EARNINGS IN AIRCRAFT AND PARTS PLANTS 1939—1952

Monthly Average for the Year	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1939	N.A.	N.A.	$0.83	N.A.	N.A.
1940	N.A.	N.A.	.83	N.A.	N.A.
1941	N.A.	N.A.	1.00	N.A.	N.A.
1942	N.A.	N.A.	1.21	N.A.	N.A.
1943	N.A.	N.A.	1.26	N.A.	N.A.
1944	N.A.	N.A.	1.31	N.A.	N.A.
1945	N.A.	N.A.	1.28	N.A.	N.A.
1946	N.A.	N.A.	1.34	N.A.	N.A.
1947	$1.38	$1.36	1.41	$1.44	$1.41
1948	1.49	1.47	1.55	1.57	1.55
1949	1.57	1.55	1.60	1.63	1.61
1950	1.64	1.62	1.70	1.73	1.70
1951	1.79	1.75	1.89	1.93	1.80
1952	1.90	1.87	1.98	2.05	1.88

N.A.—Not available.

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–16. AVERAGE HOURLY EARNINGS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1950					
Jan.....	$1.60	$1.59	$1.62	$1.64	$1.65
Feb.....	1.61	1.60	1.63	1.69	1.65
Mar.....	1.61	1.60	1.63	1.66	1.67
Apr.....	1.61	1.60	1.62	1.64	1.66
May.....	1.61	1.59	1.64	1.63	1.66
June.....	1.61	1.59	1.64	1.67	1.66
July.....	1.62	1.59	1.66	1.70	1.68
Aug.....	1.63	1.60	1.69	1.77	1.67
Sept.....	1.67	1.65	1.70	1.78	1.70
Oct.....	1.68	1.64	1.75	1.82	1.77
Nov.....	1.69	1.66	1.80	1.86	1.74
Dec.....	1.73	1.69	1.85	1.93	1.78
1951					
Jan.....	1.76	1.72	1.84	1.92	1.79
Feb.....	1.75	1.72	1.84	1.94	1.77
Mar.....	1.77	1.73	1.89	1.95	1.80
Apr.....	1.76	1.71	1.89	1.93	1.80
May.....	1.77	1.73	1.88	1.91	1.79
June.....	1.77	1.73	1.90	1.92	1.78
July.....	1.78	1.75	1.89	1.92	1.78
Aug.....	1.78	1.75	1.88	1.91	1.78
Sept.....	1.81	1.78	1.91	1.93	1.80
Oct.....	1.81	1.77	1.92	1.93	1.82
Nov.....	1.82	1.79	1.92	1.94	1.81
Dec.....	1.83	1.80	1.93	1.96	1.83
1952					
Jan.....	1.85	1.82	1.93	1.96	1.84
Feb.....	1.86	1.84	1.91	1.95	1.85
Mar.....	1.88	1.86	1.95	2.02	1.86
Apr.....	1.86	1.84	1.92	2.01	1.87
May.....	1.88	1.85	1.96	2.06	1.88
June.....	1.88	1.85	1.98	2.06	1.86
July.....	1.89	1.86	1.98	2.06	1.85

TABLE 3–16. AVERAGE HOURLY EARNINGS IN AIRCRAFT AND PARTS PLANTS JANUARY 1950 TO DATE—*Continued*

Year and Month	TOTAL	Aircraft (Airframes)	Aircraft Engines and Parts	Aircraft Propellers and Parts	Other Aircraft Parts and Equipment
1952					
Aug.....	$1.89	$1.87	$1.96	$2.06	$1.84
Sept.....	1.93	1.90	2.01	2.10	1.90
Oct.....	1.94	1.91	2.01	2.05	1.91
Nov.....	1.96	1.93	2.04	2.09	1.92
Dec.....	1.96	1.94	2.03	2.08	1.94
1953					
Jan.....	1.98	1.96	2.04	2.06	1.95
Feb.....	1.98	1.96	2.02	2.07	1.96
Mar.....	1.99	1.98	2.01	2.01	1.97
Apr.....	1.98	1.98	2.00	2.03	1.97
May.....	1.98	1.97	2.00	2.02	1.96
June.....	1.98	1.96	2.02	2.06	1.97
July.....	1.98	1.96	2.03	2.04	1.98

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–17. WOMEN EMPLOYEES IN THE AIRCRAFT INDUSTRY, 1942 TO DATE

Date	Number (thousands)	Percent
Jan. 1942.....	23.1	5.0
Nov. 1943.....	486.1	36.7
Oct. 1947.....	28.5	11.8
Sept. 1949.....	33.3	12.5
Dec. 1949.....	32.5	12.5
Mar. 1950.....	31.1	12.0
June 1950.....	31.5	12.0
Sept. 1950.....	36.2	12.4
Dec. 1950.....	47.0	13.6
Mar. 1951.....	61.1	15.0
June 1951.....	77.5	16.9
Sept. 1951.....	88.6	17.7
Dec. 1951.....	104.1	18.5
Mar. 1952.....	111.1	18.5
June 1952.....	117.4	18.5
Sept. 1952.....	117.9	18.0
Dec. 1952.....	130.2	18.3
Mar. 1953.....	130.1	17.7
June 1953.....	131.3	18.0

Sources: 1942–1943: Bureau of Labor Statistics, "Wartime Development of the Aircraft Industry," Bulletin No. 800, p. 8.

1947: Bureau of the Census, "Census of Manufactures, 1947, Aircraft and Parts," p. 3.

1949 to date: Bureau of Labor Statistics, "Employment and Payrolls" (Monthly). Brought up to date by BLS.

TABLE 3-18. LABOR TURNOVER IN THE AIRCRAFT AND PARTS INDUSTRY 1950 TO DATE

Rates per 100 Employees per Year

Industry and Date	Accession Rates	Separation Rates				
		Total	Quits	Discharge	Layoff	Miscellaneous including Military
TOTAL						
1950.....	62.8	33.8	19.5	2.8	8.7	2.8
1951.....	94.8	50.0	37.7	4.8	.8	6.7
1952.....	63.1	45.9	35.3	4.6	2.8	3.2
1953, Jan..	4.4	3.1	2.3	.3	.2	.3
Feb..	3.8	3.2	2.2	.3	.4	.3
Mar..	3.7	3.7	2.6	.4	.5	.3
Apr..	3.6	3.7	2.6	.4	.4	.3
May.	3.7	4.0	2.9	.4	.5	.3
June.	5.4	4.3	2.8	.4	.8	.2
July[b].	5.0	3.8	2.8	.4	.5	.2
AIRCRAFT (Airframes)						
1950.....	67.2	37.1	21.7	2.4	10.0	3.0
1951.....	97.5	52.4	40.3	4.5	.5	7.1
1952.....	64.1	49.0	38.8	4.2	2.8	3.2
1953, Jan..	3.5	3.1	2.4	.3	.1	.3
Feb..	3.3	3.3	2.3	.2	.5	.3
Mar..	3.7	3.6	2.6	.3	.4	.2
Apr..	3.4	3.6	2.6	.3	.5	.3
May.	3.6	3.9	2.9	.3	.5	.2
June.	5.4	4.6	3.0	.3	1.1	.2
July[b].	5.2	3.9	2.9	.3	.6	.1
AIRCRAFT ENGINES & PARTS						
1950.....	48.2	21.3	12.4	2.3	4.7	1.9
1951.....	86.9	39.6	28.9	5.8	.2	4.7
1952.....	60.1	40.8	26.3	6.3	3.2	4.9
1953, Jan..	6.8	2.9	1.9	.5	.1	.4
Feb..	5.0	3.1	2.0	.5	.1	.4
Mar..	3.3	4.2	2.4	.5	.8	.5
Apr..	3.6	4.0	2.6	.5	.4	.5
May.	3.8	4.3	2.9	.6	.4	.5
June.	5.3	3.5	2.4	.4	.1	.5
July[b]	4.3	3.3	2.3	.6	.2	.2

TABLE 3–18. LABOR TURNOVER IN THE AIRCRAFT AND PARTS INDUSTRY 1950 TO DATE—*Continued*

Rates per 100 Employees per Year

Industry and Date	Accession Rates	Separation Rates				
		Total	Quits	Discharge	Layoff	Miscellaneous including Military
AIRCRAFT PROPELLERS & PARTS						
1950	32.0	17.6	9.9	1.8	4.3	1.6
1951	52.7	27.6	17.4	3.3	1.0	5.9
1952	49.1	25.1	19.1	3.1	1.3	1.5
1953, Jan.	5.5	1.8	1.6	.1	[a]	.1
Feb.	2.6	2.9	2.3	.3	.3	.1
Mar.	3.1	2.8	2.3	.2	[a]	.3
Apr.	2.8	3.3	2.7	.2	.1	.2
May	2.4	3.1	2.6	.2	.1	.1
June	3.2	2.1	1.7	.2	[a]	.2
July[b]	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
OTHER AIRCRAFT PARTS & EQUIPMENT						
1950	59.6	27.6	15.5	5.0	5.2	1.9
1951	89.6	44.5	29.1	6.7	2.0	6.7
1952	65.3	41.3	27.6	6.2	4.6	3.1
1953, Jan.	5.5	3.8	2.4	.6	.5	.4
Feb.	4.8	3.2	2.0	.6	.4	.3
Mar.	5.2	4.2	2.5	.8	.6	.4
Apr.	5.0	3.9	2.6	.7	.2	.3
May	5.0	4.0	2.7	.6	.5	.3
June	5.9	4.1	2.7	.7	.5	.2
July[b]	6.0	4.1	3.0	.8	.2	.2

N.A.—Not available.

[a] Less than .05.

[b] Preliminary.

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–19. ESTIMATED UNIONIZATION IN THE AIRCRAFT INDUSTRY

Type of Plants and Year	Number of Plants Reporting		Percent of Employees in Union	Percent of Unionized Employees in		
	With Union	Without Union		IAM	CIO	Other
AIRFRAMES						
1948	24	9	88	63	36	1
1950	26	14	92	66	34	—
ENGINES						
1948	10	5	98	43	57	—
PROPELLERS						
1948	5	3	93	85	15	—

Sources: Aircraft Industries Association, "Brief in the Matter of Redetermination of the Prevailing Minimum Wage in the Aircraft Manufacturing Industry Conducted by the Division of Public Contracts of the Department of Labor under Section 1 (b) of the Walsh-Healey Public Contracts Act (Public Act 846—74th Congress)," July 26, 1949, p. 37, brought up to date from AIA files.

Bureau of Labor Statistics, "Collective Bargaining, Aircraft Industry," June 1952, p. 5.

TABLE 3–20. LABOR TURNOVER IN THE AIRFRAME INDUSTRY, 1939–1952
Rates per 100 Employees per Year

Year	Accession Rates	Separation Rates				
		Total	Quits	Discharge	Layoff	Miscellaneous, including Military
1939	111.7	38.7	15.5	3.2	20.0	—
1940	120.4	45.7	27.0	5.2	12.5	1.0
1941	124.4	44.0	30.1	5.7	3.9	4.3
1942	133.5	72.8	45.3	6.2	1.4	19.9
1943[a]	92.7	75.6	55.3	6.5	2.4	11.4
1944	57.1	79.3	56.4	7.3	7.9	7.7
1945	55.1	179.1	58.5	7.1	108.5	5.0
1946	87.7	81.1	41.4	4.3	34.1	1.3
1947	71.4	81.8	45.0	3.8	31.9	1.1
1948	61.4	49.8	32.7	3.2	12.7	1.2
1949	46.1	46.5	20.7	2.9	22.0	.9
1950	67.2	37.1	21.7	2.4	10.0	3.0
1951	97.5	52.4	40.3	4.5	.5	7.1
1952	64.1	49.0	38.8	4.2	2.8	3.2

[a] Beginning with 1943 labor turnover data refer to all employees; previously to factory workers only.

Source: Bureau of Labor Statistics. This is a series which has been revised in 1953. It replaces figures previously published.

TABLE 3–21. WORK STOPPAGES IN THE AIRCRAFT AND PARTS INDUSTRY 1927–1952

Year	Number of Strikes	Number of Workers Involved[a]	Man-Days Idle in Year
1927	1	15	105
1928	—	—	—
1929	—	—	—
1930	1	600	9,600
1931	—	—	6,600[b]
1932	—	—	—
1933	2	538	2,660
1934	4	3,207	111,048
1935	1	1,700	6,800
1936	—	—	—
1937	6	9,390	90,964
1938	N.A.	N.A.	N.A.
1939	2	1,263	85,419
1940	3	6,270	36,402
1941	29	28,422	112,549
1942	15	6,584	12,416
1943	60[c]	52,481[c]	130,112[c]
1944	103	189,801	386,371
1945	85	150,200[d]	581,000[d]
1946	15	21,300	557,000
1947	10	3,520	67,900
1948	8	21,400	1,100,000
1949	10	10,300	451,000
1950	18	23,900	145,000
1951	29	48,800	765,000
1952	44	81,000	927,000

N.A.—Not available.

[a] Figures on number of workers involved may include some duplicate workers if the same workers were involved in more than one stoppage during the year.

[b] Man days idle as a result of a strike which began in the preceding year and continued into 1931.

[c] In addition to the figures shown there were at least 54 strikes involving 106,993 workers and causing 242,478 man days of idleness, in plants manufacturing aircraft and aircraft parts but classified according to prewar products, in other industries. Most of these were in plants which normally manufacture automobiles and automobile equipment.

[d] From 1945 through 1952 figures have been rounded.

Source: Bureau of Labor Statistics, Division of Wage and Industrial Relations; unpublished data.

TABLE 3–22. MAJOR ISSUES INVOLVED IN WORK STOPPAGES IN THE AIRCRAFT INDUSTRY IN 1952

Major Issues	Work Stoppages Beginning in 1952				Man-Days Idle During 1952 (All Stoppages)	
	Number	Percent of Total	Workers Involved			
			Number	Percent of Total	Number	Percent of Total
All issues	44	100.0	81,000	100.0	927,000	100.0
Wages, hours and fringe benefits	16	36.4	13,600	16.8	355,000	38.3
Wage increase	13	29.6	12,500	15.4	353,000	38.0
Other	3	6.8	1,180	1.4	2,340	.3
Union Organization, Wages and Hours	6	13.6	35,500	43.8	461,000	49.7
Recognition, wages and/or hours	3	6.8	620	.7	1,610	.2
Closed or Union Shop, wages and/or hours	3	6.8	34,900	43.1	459,000	49.5
Union Organization	6	13.6	3,800	4.7	10,200	1.1
Recognition	4	9.0	2,830	3.4	8,830	.9
Other	2	4.6	930	1.2	1,390	.2
Other Working Conditions	16	36.4	28,100	34.7	101,000	10.9
Job Security	10	22.8	11,300	14.0	64,400	6.9
Shop Conditions and Policies	6	13.6	16,800	20.7	37,000	4.0

Note: Department of Labor rounds figures to three significant places. Hence, certain subtotals above will not add up to totals.

Source: Bureau of Labor Statistics, Division of Wage and Industrial Relations, letter of April 10, 1953.

TABLE 3-23. WORK-INJURY RATES FOR THE AIRCRAFT AND ALL MANUFACTURING INDUSTRIES 1939-1952

Year	Aircraft Industry		Aircraft Parts Industry		All Manufacturing	
	Injury-Frequency Rates[a]	Severity Rates[a]	Injury-Frequency Rates[a]	Severity Rates[a]	Injury-Frequency Rates[a]	Severity Rates[a]
1939	12.9	1.9	[b]	[b]	14.9	1.4
1940	15.8	1.3	[b]	[b]	15.3	1.6
1941	10.4	1.4	[b]	[b]	18.1	1.7
1942	11.4	0.7	9.5	0.9	19.9	1.5
1943	9.7	0.7	11.7	0.8	20.0	1.4
1944	8.8	0.6	10.1	0.6	18.4	1.4
1945	9.4	1.2	10.6	1.7	18.6	1.6
1946	5.2	0.8	13.7	2.1	19.9	1.6
1947	4.8	0.7	11.1	0.6	18.8	1.4
1948	4.9	0.8	10.2	0.8	17.2	1.5
1949	4.3	1.0	9.2	1.0	14.5	1.4
1950	4.0	0.9	5.9	0.6	14.7	1.2
1951	4.5	0.6	7.1	0.9	15.5	1.3
1952	3.7	0.3	6.7	0.4	14.3	1.3

[a] The *injury-frequency* rate is the average number of disabling work injuries for each million employee-hours worked.

A *disabling work injury* is any injury occurring in the course of and arising out of employment, which (a) results in death or any degree of permanent physical impairment, or (b) makes the injured worker unable to perform the duties of any regularly established job, which is open to him, throughout the hours corresponding to his regular shift on any one or more days after the day of injury (including Sundays, days off, or plant shutdowns).

The *severity rate* is the average number of days lost as a result of disabling work injuries, for each 1,000 employee-hours worked. The computations of days lost include standard time charges for fatalities and permanent disabilities.

[b] Included with "Aircraft."

Source: Bureau of Labor Statistics, "Work Injuries in the United States During 1950"; brought up to date from BLS files.

CHAPTER IV

FINANCE

The aircraft manufacturing industry has had a history of rapid expansions in sales volume followed by sudden and sharp contractions. The increases in production and production facilities during recurring periods of national emergency have occurred with explosive force, when contrasted with the normal standards of industrial growth. In a matter of months in World War II, for example, the aircraft industry underwent an expansion of production and production capacity that would take manufacturers of commercial products many years to accomplish.

Major Divisions of the Aircraft Manufacturing Industry

Although the airframe manufacturer designs the complete aircraft, he manufactures only the airframe—and then installs in this airframe many important component parts such as powerplants, fire control systems, radar and electronic equipment, etc. These component parts are known as Government Furnished Property (GFP) and are purchased by the military services, then furnished to the airframe manufacturer for installation.

(Since the value of GFP items represents more than 50 per cent of the cost of a completed aircraft, figures used below do not represent the total dollar amounts in the military aircraft production program. The financial problems involved, however, which are indicated by some of the balance sheet relationships in following tables, are applicable equally to the designers and manufacturers of these important component and accessory items.)

Capitalization as Contracting Industry

The aircraft manufacturing industry is a contracting industry and is capitalized accordingly. This requires that the capitalization of companies (1) provide the credit stability and financial strength needed to support a high volume of sales and, yet (2), avoid the costly burden of overcapitalization during prolonged periods of low volume.

Furthermore, as is the case with other contracting industries, the

most economical and efficient method of financing production is for the customer (whether a commercial airline or the U.S. Government) to provide much of the financing needed for performance of the contract. If such were not the practice, and if contracting industries were capitalized to handle their infrequent peak volume, it would be necessary during years of low volume for the price of the end product to include the carrying cost of excess capitalization.

It will be noted (see Table 4-7) that during World War II the customer provided financing in the form of advances or contract deposits. During the Korean build-up, customer financing has been provided primarily through progress payments.

The data contained in the tables in this chapter cover the activities of the 12 major airframe manufacturers, based upon sales volume for each of the years from 1937 through 1952. Since the financial reports of the United Aircraft Corporation are released on a consolidated basis only, the activities of their Chance-Vought and Sikorsky Divisions are not included in the tables.

Effect of Emergency Production Expansion on Financial Condition

The degree to which a suddenly expanded military production program affects the financial condition of the industry is shown by the following changes in the financial status of the 12 major airframe companies during the period 1950-1952.

	(Dollar Figures in Millions)	
	1950	*1952*
Net Worth	$ 380.0	$ 447.6
Working Capital	287.7	308.4
Inventory—Net	208.3	531.0
Receivables	227.4	479.5
Plant	82.8	154.0
Sales Volume	1,388.2	3,731.1
Working Capital Turnover (Times)	4.8	12.1

In this period (1950-1952) the total net worth of the 12 companies was increased by $67.6 million, most of which represented reinvested earnings. All of this increased capitalization went into needed production facilities—brick and mortar, as well as machine tools and equipment.

Working capital in the same period increased $20.7 million. With this modest expansion of working capital these companies were able to finance a $575 million increase in accounts receivable and inventory. To accomplish this financing, working capital turnover was increased from 4.8

times per year to 12.1 times per year. A working capital turnover of this magnitude, in an industry which is manufacturing an exceptionally high unit-cost product with a 16 to 30 month manufacturing cycle, requires careful and close control both of the amount of working capital and the manner in which it is used. Under these conditions, the length of time between receipt of cash and its disbursement is extremely short and any disturbance in the flow of incoming cash would inevitably have a serious effect upon an individual company's—or an industry's—entire operations.

Control of Accounts Receivable and Inventories

Control of the manner in which working capital is used requires that constant effort be exerted to keep the amount of funds tied up in accounts receivable and inventories at an absolute minimum and thus to retain in the form of cash sufficient amounts to meet vastly expanded payrolls and to keep on a current basis with mercantile creditors. As an example of the effects of such control, the $227.4 million in accounts receivable at the end of 1950 represented an average collection period of 60 days, based upon a sales volume of $1,388.2 million; by 1952, the average collection period for accounts receivable had been reduced to 47 days.

Inventory figures shown in the table above and in this chapter are net, after deducting progress payments received from the customer during performance of the contracts. For the year 1950, progress payments received from the Government amounted to approximately 41 per cent of the gross inventory; at the end of 1952, they amounted to approximately 70 per cent of the gross inventory. The turnover of total gross inventory (not shown in the following tables) was 3.9 times in 1950 at the start of the production build-up, and had slowed to 2.1 times in 1952. Barring further stretchouts in the overall program, however, this inventory turnover will improve considerably for the year 1953 as the production program levels out and deliveries in volume are made to the military services.

Aircraft Industry Earnings

The earnings of the aircraft industry are subject to a number of profit control measures, including renegotiation, price redetermination clauses, and various types of cost disallowances. The result of these various controls is shown by the average industry profit rate of 2.2 per cent on sales during 1952 for the 12 major airframe manufacturers. This rate is less than half of the average rate of profit on sales earned by all manufacturing corporations during 1952. This low rate of earnings is not unusual

(See Table 4-12, covering the years 1937 to date). The average earnings for the 12 major airframe manufacturers from 1943 to 1952 inclusive was 1.4 per cent on sales. This, according to Dun and Bradstreet reports, is the lowest rate of earnings on sales of any manufacturing industry for this 10-year period. With these limited earnings, the industry's dividend policies have of necessity been conservative and the percentage of earnings paid out in dividends is well below the average of all manufacturing industries.

TABLE 4-1. GROSS SALES AND NET PROFITS OF CORPORATIONS PRODUCING AIRCRAFT AND PARTS[a]. 1928—1950
(Dollar Figures in Millions)

Year	Total Number of Corporations	Total Gross Sales	Total Net Profit or Loss before Federal Taxes	Total Net Profit or Loss after Federal Taxes
1928	145	$ 59.6	$ 11.1	$ 9.5
1929	194	90.8	4.9	3.4
1930	157	74.8	(14.1)	(14.7)
1931	132	47.6	(13.2)	(13.3)
1932	102	29.1	(9.0)	(19.0)
1933	95	24.3	(5.1)	(5.1)
1934	112	51.3	(3.0)	(3.2)
1935	117	50.0	(1.4)	(1.8)
1936	123	85.8	4.9	3.9
1937	126	140.9	10.8	8.4
1938	137	186.9	23.3	18.9
1939	156	285.3	41.0	32.6
1940	201	654.4	146.0	86.3
1941	249	1,990.8	477.1	183.0
1942[b]	339	7,822.7	1,093.3	411.3
1943[b]	489	15,774.0	1,817.1	598.1
1944[b]	492	18,037.5	1,602.4	526.9
1945[b]	404	12,686.2	750.0	289.6
1946	274	1,122.9	(117.5)	(129.8)
1947	245	1,068.9	(116.3)	(130.5)
1948	209	1,521.1	85.7	47.8
1949	229	1,935.6	104.6	61.7
1950[c]	238	NA	235.6	135.8

Figures in parentheses indicate loss.
NA—Not available.
[a] Including engines.
[b] The classification is determined by the activity which accounts for the largest percentage of total receipts. During the Second World War some major automotive corporations such as General Motors Corporation may have been classified as aircraft manufacturers.
[c] Preliminary data.
Sources: Treasury Department, Bureau of Internal Revenue; unpublished data.
Treasury Department Information Release No. H-124, May 20, 1953.

TABLE 4-2. CORPORATIONS PRODUCING AIRCRAFT AND PARTS[a] REPORTING NET INCOME AND NO NET INCOME, 1928—1950
(Dollar Figures in Millions)

Year	Number of Corporations Reporting		Gross Sales of Corporations Reporting		Net Income before Taxes of Corporations Reporting Net Income	Net Loss of Corporations Reporting No Net Income
	Net Income	No Net Income	Net Income	No Net Income		
1928	43	102	$ 53.2	$ 6.4	$ 13.6	$ 2.5
1929	45	149	69.6	21.2	14.1	9.3
1930	32	125	42.3	32.5	4.7	18.9
1931	16	116	6.3	41.3	.9	14.1
1932	13	89	8.9	20.2	.4	9.3
1933	13	82	6.1	18.2	.4	5.5
1934	20	92	31.7	19.6	1.5	4.4
1935	25	92	23.2	26.8	3.1	4.4
1936	39	84	73.9	11.9	6.9	2.0
1937	46	80	127.9	13.0	13.3	2.5
1938	45	92	172.1	14.8	25.8	2.5
1939	56	100	261.4	23.9	46.8	5.8
1940	101	100	623.7	30.7	152.1	6.1
1941	162	87	1,971.9	18.9	481.4	4.3
1942[b]	250	89	7,740.3	82.4	1,095.9	2.5
1943[b]	383	106	15,576.8	197.2	1,822.7	5.6
1944[b]	391	101	17,892.3	145.2	1,607.3	4.9
1945[b]	282	122	12,575.1	111.1	763.2	13.2
1946	86	188	345.4	777.5	38.3	155.8
1947	86	159	468.0	600.9	38.9	155.2
1948	104	105	1,269.9	251.2	108.1	22.4
1949	131	98	1,691.7	243.9	118.9	14.3
1950[c]	153	85	NA	NA	239.7	4.1

NA—Not available.

[a] Including engines.

[b] The classification is determined by the activity which accounts for the largest percentage of total receipts. During the Second World War some major automotive corporations such as General Motors Corporation may have been classified as aircraft manufacturers.

[c] Preliminary data.

Sources: Treasury Department, Bureau of Internal Revenue; unpublished data.
Treasury Department Information Release No. H-124, May 20, 1953.

TABLE 4-3. QUARTERLY NET SALES REPORTED BY MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, AND PROPELLERS, 1948 TO DATE
(Millions of Dollars)

Year and Quarter Ending	TOTAL NET SALES	Net Sales of		
		Complete Aircraft and Parts		
		Total	To U. S. Military	To Others
1948	$1,158[a]	$ 748	$ 626	$122
June 30	351	218	170	48
Sept 30	374	249	209	40
Dec 31	433	281	247	34
1949	1,781	1,098	927	171
Mar 31	382	226	187	39
June 30	429	264	232	32
Sept 30	459	289	243	46
Dec 31	511	319	265	54
1950	2,274	1,416	1,255	161
Mar 31	554	367	322	45
June 30	531	329	296	33
Sept 30	539	343	305	38
Dec 31	650	377	332	45
1951	3,456	1,883	1,657	226
Mar 31	656	363	328	35
June 30	794	469	415	54
Sept 30	898	449	388	61
Dec 31	1,108	602	526	76
1952	6,497	3,897	3,442	455
Mar 31	1,300	768	677	91
June 30	1,557	933	808	125
Sept 30	1,588	968	853	115
Dec 31	2,052	1,228	1,104	124
1953				
Mar 31	2,024	1,224	1,104	120
June 30	2,220	1,403	1,279	124

[a] Total for last three quarters of 1948 only.

Source: Bureau of the Census, "Facts for Industry", Series M42D (Quarterly).

TABLE 4–3. QUARTERLY NET SALES REPORTED BY MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, AND PROPELLERS, 1948 TO DATE
(Millions of Dollars)

Net Sales of						
Aircraft Engines and Parts			Aircraft Propellers and Parts			Other Products and Services
Total	To U. S. Military	To Others	Total	To U. S. Military	To Others	
$ 265	$ 222	$ 43	$ 48	$ 36	$ 12	$ 97
91	71	20	17	13	4	25
78	66	12	14	10	4	33
96	85	11	17	13	4	39
508	461	47	62	50	12	113
113	101	12	14	10	4	29
120	108	12	19	16	3	26
127	116	11	14	12	2	29
148	136	12	15	12	3	29
583	519	64	75	62	13	200
136	120	16	19	16	3	32
136	120	16	20	16	4	46
131	116	15	18	15	3	47
180	163	17	18	15	3	75
879	779	100	110	89	21	584
183	161	22	22	17	5	88
173	149	24	27	21	6	125
259	234	25	28	23	5	162
264	235	29	33	28	5	209
1,609	1,440	169	148	122	26	843
310	268	42	35	29	6	187
377	332	45	39	32	7	208
374	333	41	32	26	6	214
548	507	41	42	35	7	234
570	531	39	44	37	7	186
578	532	46	49	42	7	190

TABLE 4-4. BACKLOG OF ORDERS REPORTED BY MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, AND PROPELLERS[a], 1948 TO DATE
(Millions of Dollars)

Backlog as of	TOTAL BACKLOG[a]	Backlog of Orders of		
		Complete Aircraft and Parts		
		Total	From U. S. Military	From Others
1948				
Mar 31	$2,108	$1,463	$1,280	$183
June 30	3,212	2,315	2,158	157
Sept 30	3,236	2,227	2,082	145
Dec 31	3,104	2,094	1,962	132
1949				
Mar 31	2,989	1,992	1,868	124
June 30	2,878	1,907	1,762	145
Sept 30	2,858	1,852	1,726	126
Dec 31	3,010	2,013	1,913	100
1950				
Mar 31	2,903	1,862	1,743	119
June 30	2,988	1,908	1,774	134
Sept 30	4,788	2,950	2,753	197
Dec 31	5,039	3,102	2,759	343
1951				
Mar 31	8,068	5,286	4,795	491
June 30	9,469	6,059	5,434	625
Sept 30	10,955	7,198	6,465	733
Dec 31	12,666	8,124	7,334	790
1952				
Mar 31	13,753	8,636	7,777	859
June 30	14,307	9,044	8,177	867
Sept 30	16,000	10,127	9,300	827
Dec 31	17,653	11,222	10,386	836
1953				
Mar 31	18,502	11,994	11,173	821
June 30	18,940	12,398	11,637	761

[a] Due to the reporting of subcontracts both by the prime contractor and the subcontractor, both of which are airframe producers, there is some duplication in these figures on value of backlog. As of June 30, 1953 the duplication amounted to $330 million.

Source: Bureau of the Census, "Facts for Industry", Series M42D (Quarterly).

TABLE 4–4. BACKLOG OF ORDERS REPORTED BY MANUFACTURERS OF COMPLETE AIRCRAFT, AIRCRAFT ENGINES, AND PROPELLERS[a], 1948 TO DATE
(Millions of Dollars)

Backlog of Orders of						
Aircraft Engines and Parts			Aircraft Propellers and Parts			Other Products and Services
Total	From U. S. Military	From Others	Total	From U. S. Military	From Others	
$ 488	$ 455	$ 33	$ 84	$ 71	$13	$ 73
693	669	24	116	105	11	88
798	772	26	112	102	10	99
786	759	27	103	96	7	121
783	745	38	101	96	5	113
689	651	38	106	101	5	176
734	694	40	99	93	6	173
749	710	39	91	85	6	157
761	727	34	97	92	5	183
786	757	29	100	96	4	194
1,418	1,373	45	142	135	7	278
1,470	1,399	71	145	129	16	322
2,123	2,017	106	169	150	19	490
2,514	2,385	129	228	201	27	668
2,661	2,506	155	236	207	29	860
3,532	3,351	181	241	213	28	769
4,081	3,883	198	233	202	31	803
4,159	3,980	179	267	235	32	837
4,617	4,441	176	309	277	32	947
5,172	4,992	180	298	267	31	961
5,314	5,138	176	305	276	29	889
5,303	5,144	159	305	278	27	934

TABLE 4-5. INCOME ACCOUNTS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952
(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Net sales	$61.8	$88.5	$141.0	$247.4	$812.6	$2788.9	$5209.0
Operating profit[a]	5.2	10.6	21.8	46.6	178.1	379.9	489.2
Total income[b]	4.9	9.6	22.7	49.5	182.4	387.4	495.8
Contingencies	.....	.....	.....	.5	8.0	27.7	42.7
Total federal taxes, net	1.3	2.1	4.5	13.3	108.6	281.2	357.0
Net profit	2.3	8.0	14.6	31.8	60.1	60.6	72.8

cr—Credit.
Figures in parentheses indicate loss.
[a] Operating profit represents all profits derived from operations.
[b] Total income includes non-operating income or loss, (before contingencies, federal taxes, special charges, etc.).
[c] A major portion of the income under military contracts is subject to renegotiation. Many contracts are subject to price redetermination. All recent profit statements are therefore tentative only.
[d] Excludes special income credits (portion of reserves for contingencies provided in former years no longer required).
[e] Includes losses on abandonment of airplane projects by one manufacturer.
[f] Net profits after deduction of $22.2 million loss reported by one company.
Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-6. INCOME ACCOUNTS, AVERAGE AIRFRAME COMPANY, 1937—1952
(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Net sales	$5.1	$7.4	$11.7	$20.6	$67.7	$232.4	$434.1
Operating profit[a]	.4	.9	1.8	3.9	14.8	31.7	40.8
Total income[b]	.4	.8	1.9	4.1	15.2	32.3	41.3
Contingencies	.....	.....	.....	.04	.7	2.3	3.5
Total federal taxes, net	.1	.2	.4	1.1	9.0	23.4	29.7
Net profit	.2	.7	1.2	2.7	5.0	5.1	6.1

cr—Credit.
Figures in parentheses indicate loss.
[a] Operating profit represents all profits derived from operations.
[b] Total income includes non-operating income or loss, (before contingencies, federal taxes, special charges, etc.).
[c] A major portion of the income under military contracts is subject to renegotiation. Many contracts are subject to price redetermination. All recent profit statements are therefore tentative only.
[d] Excludes special income credits (portion of reserves for contingencies provided in former years and no longer required).
[e] Includes losses on abandonment of airplane projects by one manufacturer.
[f] Amount was $6,000.
[g] Average net profit after deduction of $22.2 million loss reported by one company.
Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4–5. INCOME ACCOUNTS, 12 MAJOR AIRFRAME COMPANIES, 1937–1952
(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951	1952
$5766.3	$3965.3	$519.0	$545.0	$843.4	$1131.7	$1388.2	$1979.3	$3731.1
363.8	251.1	(43.5)	(97.8)	23.8	56.7	110.2	93.9	221.8
367.7	256.8	(35.2)	(115.4)[e]	26.5	57.9	111.1	99.1	220.5
38.1	cr 3.7	1.8	.....	1.9	.1	.....	.....	.....
263.5	147.7	cr 26.3	cr 73.5	21.8	21.7	48.5	68.0	138.8
58.6	67.4	(10.7)[d]	(41.9)[d]	2.4	36.1	62.6[c]	30.9[cf]	81.7[c]

TABLE 4–6. INCOME ACCOUNTS, AVERAGE AIRFRAME COMPANY, 1937–1952
(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951	1952
$480.5	$330.4	$43.2	$45.4	$70.3	$94.3	$115.7	$164.9	$310.9
30.3	20.9	(3.6)	(8.1)	2.0	4.7	9.2	7.8	18.5
30.6	21.4	(2.9)	(9.6)[e]	2.2	4.8	9.2	8.3	18.4
3.2	cr .3	.1	.....	.2	[f]	.....	.....	.....
22.0	12.3	cr 2.2	cr 6.1	1.8	1.8	4.0	5.7	11.6
4.9	5.6	(.9)[d]	(3.5)[d]	.2	3.0	5.2[c]	2.6[cg]	6.8[c]

TABLE 4-7. BALANCE SHEETS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952
(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Assets.							
Current assets.							
Cash	$ 7.4	$15.6	$ 35.6	$180.0	$111.5	$ 294.1	$ 304.5
Securities	.1	1.5	1.3	2.0	19.6	12.2	115.6
Restricted Cash	.....	.....	.....	2.5	22.4	9.1	49.8
Receivables	19.9	14.8	12.8	48.6	161.3	514.3	781.4
Inventories	15.0	16.5	47.6	142.2	346.7	424.3	434.2
Miscellaneous current assets	.3	.4	.1	22.5	.8	2.9	17.9
Total current assets	$42.7	$48.8	$97.4	$397.8	$662.3	$1256.9	$1703.4
Total net plant	15.3	16.7	23.4	54.5	110.3	92.6	103.7
Other assets.							
Postwar tax refund	.1	.....	.....	.3	.....	8.4	43.0
Investments	.3	.3	1.0	2.4	5.5	11.4	8.0
Development, etc., expenses	1.6	3.6	3.1	4.4	7.1	.1	.7
Deferred charges	1.2	1.1	2.4	10.6	7.2	13.7	15.4
Miscellaneous assets	4.5	3.5	3.9	1.1	13.7	26.3	8.7
Total assets	$65.7	$74.0	$131.2	$471.1	$806.1	$1409.4	$1882.9

TABLE 4-7. BALANCE SHEETS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952
(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951[c]	1952
$ 291.8	$ 182.8	$174.3	$ 99.3	$ 87.2	$109.4	$106.6	$ 159.7	$ 216.5
97.3	139.5	.....	.....	38.6	35.8	27.2	8.5	5.6
20.0	4.4	3.4	.3	[a]	[a]	[a]	[a]	[a]
716.7	468.6	125.5	136.9	185.3	164.9	227.4	360.2	479.5
331.8	130.9	237.1	293.8	210.3	161.2[b]	208.3	373.4	531.0
2.8	32.4	.4	4.5	3.3	6.1	5.0	13.1	18.6
$1460.4	$958.6	$540.7	$534.8	$524.7	$477.4[b]	$574.5	$914.9	$1251.2
69.9	27.4	48.8	74.0	70.1	69.3	82.8	124.4	154.0
74.0	4.8	4.9	.....	9.7	.....	.....	.....	.....
7.4	17.1	22.2	11.2	8.5	6.2	6.6	9.2	9.5
.9	1.1	2.3	1.0	1.1	.2	.....	.....	1.8
10.5	6.4	10.5	7.5	5.6	4.6	4.8	13.3	11.9
4.4	5.9	.8	9.6	1.3	12.5	12.7		
$1627.5	$1021.3	$630.2	$638.1	$621.0	$570.2[b]	$681.4	$1061.8	$1428.4

TABLE 4-7. BALANCE SHEETS, 12 MAJOR AIRFRAME COMPANIES, 1937–1952—*Continued*

(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Liabilities.							
Current liabilities.							
Payables	$13.6	$10.4	$ 14.3	$ 37.4	$ 92.4	$ 297.6	$ 448.6
Accruals-taxes, renegotiation, refunds due United States	2.6	3.7	7.5	19.6	122.8	446.7	614.3
Advances-contracts deposits	4.2	.1	35.6	253.6	351.6	385.5	344.2
Reserve	.....	.....	.....	.7	.3	.1	1.0
Miscellaneous current liabilities	.9	3.7	2.4	20.5	14.9	4.0	36.5
Total current liabilities	$21.3	$17.9	$59.8	$331.8	$582.0	$1133.9	$1444.6
Other liabilities.							
Bank loans, etc.	1.1	1.7	1.6	16.0	64.7	13.9	109.5
Contingency reserve	.5	1.8	.9	1.5	12.8	46.0	87.8
Capital stock	17.0	17.6	20.8	23.2	22.8	26.7	27.4
Capital (paid) surplus	21.3	26.4	28.0	29.2	48.8	54.2	55.5
Earned surplus	4.2	8.4	19.4	37.9	74.8	119.5	155.7
Miscellaneous liabilities	.3	.2	.7	31.5	.2	15.2	2.4
Total liabilities	$65.7	$74.0	$131.2	$471.1	$806.1	$1409.4	$1882.9
Net current assets	$21.4	$30.9	$37.6	$ 66.0	$ 80.3	$ 123.0	$ 258.8

[a] Restricted cash is included in "cash."

[b] To make this figure comparable to the figures of preceding years it has to be increased by $64,016,000 to allow for changes in the accounting practice of one company.

[c] Revised.

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-7. BALANCE SHEETS, 12 MAJOR AIRFRAME COMPANIES, 1937–1952—*Continued*

(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951[c]	1952
$ 475.4	$ 220.1	$115.1	$120.0	$ 98.4	$ 68.4	$121.1	$ 369.9	$ 541.0
449.5	216.4	47.9	60.6	66.9	88.9	113.9	209.0	297.1
295.7	148.3	62.4	101.3	101.1	53.8[b]	40.0	48.1	91.5
4.6	3.7	.....	.....	11.6	6.9	6.2	4.9	3.6
10.2	3.8	3.7	1.6	1.9	3.8	5.6	8.5	9.6
$1235.4	$592.3	$229.1	$283.5	$279.9	$221.8[b]	$286.8	$640.4	$942.8
5.0	2.4	16.9	21.2	21.7	10.5	12.7	27.8	30.8
126.3	86.7	35.7	22.3	1.9	1.2	.....	.....	.5
26.8	30.4	27.6	27.6	57.2	57.4	61.9	66.2	94.8
53.1	55.5	56.3	60.7	56.1	59.9	62.6	61.4	68.9
178.5	251.2	263.7	226.2	202.5	215.4	255.5	260.8	283.4
2.4	2.8	.9	(3.4)	1.7	4.0	1.9	5.2	7.2
$1627.5	$1021.3	$630.2	$638.1	$621.0	$570.2[b]	$681.4	$1061.8	$1428.4
$ 225.0	$ 366.3	$311.6	$251.3	$244.8	$255.6	$287.7	$ 274.5	$ 308.4

TABLE 4-8. BALANCE SHEETS, AVERAGE AIRFRAME COMPANY, 1937—1952
(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Assets.							
Current assets.							
Cash	$ .61	$1.30	$ 2.97	$14.99	$ 9.29	$ 24.51	$ 25.38
Securities	.01	.13	.11	.17	1.63	1.02	9.64
Restricted Cash	.....	.....	.....	.21	1.87	.76	4.14
Receivables	1.66	1.23	1.07	4.05	13.44	42.86	65.11
Inventories	1.25	1.37	3.96	11.85	28.89	35.35	36.19
Miscellaneous current assets	.02	.03	.01	1.88	.07	.24	1.49
Total current assets	$3.55	$4.06	$8.12	$33.15	$55.19	$104.74	$141.95
Total net plant	1.27	1.39	1.95	4.54	9.19	7.72	8.64
Other assets.							
Postwar tax refund	.01	.....	.....	.02	.....	.70	3.59
Investments	.03	.03	.08	.20	.46	.95	.67
Development, etc., expenses	.13	.30	.26	.37	.59	.01	.06
Deferred charges	.10	.09	.20	.89	.60	1.14	1.28
Miscellaneous assets	.38	.29	.32	.09	1.15	2.19	.72
Total assets	$5.47	$6.16	$10.93	$39.26	$67.18	$117.45	$156.91

TABLE 4-8. BALANCE SHEETS, AVERAGE AIRFRAME COMPANY, 1937—1952
(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951[c]	1952
$ 24.31	$15.23	$14.53	$ 8.28	$ 7.26	$ 9.12	$ 8.88	$13.31	$ 18.04
8.11	11.63	.....	.....	3.22	2.98	2.27	.71	.47
1.67	.37	.29	.02	[a]	[a]	[a]	[a]	[a]
59.73	39.05	10.46	11.41	15.44	13.74	18.95	30.02	39.96
27.65	10.91	19.75	24.48	17.53	13.43[b]	17.36	31.11	44.25
.23	2.70	.03	.38	.28	.51	.42	1.09	1.55
$121.70	$79.89	$45.06	$44.57	$43.73	$39.78[b]	$47.88	$76.24	$104.27
5.82	2.28	4.07	6.16	5.84	5.78	6.90	10.37	12.83
6.17	.40	.40	.....	.80	.....	.....	.....	.....
.62	1.42	1.85	.93	.71	.52	.55	.77	.79
.08	.09	.20	.09	.09	.02	.....	.....	.15
.88	.54	.87	.62	.47	.38	.40	1.11	1.00
.36	.49	.07	.80	.11	1.04	1.06		
$135.63	$85.11	$52.52	$53.17	$51.75	$47.52[b]	$56.79	$88.49	$119.04

TABLE 4-8. BALANCE SHEETS, AVERAGE AIRFRAME COMPANY, 1937–1952—*Continued*

(Millions of Dollars)

	1937	1938	1939	1940	1941	1942	1943
Liabilities.							
Current Liabilities.							
Payables	$1.14	$.86	$1.19	$3.12	$7.70	$24.80	$37.38
Accruals-taxes, renegotiation, refunds due United States	.22	.31	.63	1.63	10.23	37.22	51.20
Advances-contracts deposits	.35	.01	2.97	21.13	29.30	32.13	28.68
Reserve	.....	.....	.....	.06	.03	.01	.08
Miscellaneous current liabilities	.07	.31	.20	1.71	1.24	.33	3.05
Total current liabilities	$1.78	$1.49	$4.99	$27.65	$48.50	$94.49	$120.39
Other liabilities.							
Bank loans, etc.	.09	.14	.13	1.33	5.40	1.16	9.12
Contingency reserve	.04	.14	.08	.12	1.07	3.83	7.32
Capital stock	1.42	1.47	1.73	1.94	1.90	2.23	2.28
Capital (paid) surplus	1.77	2.21	2.33	2.43	4.06	4.51	4.62
Earned surplus	.35	.70	1.62	3.16	6.23	9.96	12.98
Miscellaneous liabilities	.02	.02	.05	2.63	.02	1.27	.20
Total liabilities	$5.47	$6.17	$10.93	$39.26	$67.18	$117.45	$156.91
Net current assets	$1.77	$2.57	$ 3.13	$ 5.50	$ 6.69	$ 10.25	$ 21.56

Figures in parentheses indicate loss.

[a] Restricted cash is included in "Cash."

[b] To make this figure comparable to the figures of preceding years it has to be increased by $5,344,667 to allow for changes in the accounting practice of one company.

[c] Revised.

Source: Aircraft Industries Association compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-8. BALANCE SHEETS, AVERAGE AIRFRAME COMPANY, 1937–1952—*Continued*

(Millions of Dollars)

1944	1945	1946	1947	1948	1949	1950	1951[c]	1952
$39.61	$18.34	$9.59	$10.00	$8.20	$5.70	$10.09	$30.83	$45.08
37.46	18.03	3.99	5.05	5.58	7.41	9.49	17.42	24.76
24.64	12.36	5.20	8.44	8.42	4.48[b]	3.33	4.00	7.63
.39	.31	.....	.....	.97	.58	.52	.41	.30
.85	.32	.31	.13	.16	.32	.47	.71	.80
$102.95	$49.36	$19.09	$23.62	$23.33	$18.49[b]	$23.90	$53.37	$78.57
.42	.20	1.41	1.77	1.81	.88	1.06	2.32	2.57
10.53	7.23	2.98	1.85	.16	.10	.....	.....	.04
2.23	2.53	2.30	2.30	4.77	4.78	5.16	5.51	7.90
4.42	4.63	4.69	5.06	4.67	4.99	5.21	5.11	5.75
14.88	20.93	21.97	18.85	16.87	17.95	21.30	21.74	23.61
.20	.23	.08	(.28)	.14	.33	.16	.44	.60
$135.63	$85.11	$52.52	$53.17	$51.75	$47.52[b]	$56.79	$88.49	$119.04
$ 18.75	$30.53	$25.97	$20.95	$20.40	$21.29	$23.98	$22.87	$25.70

TABLE 4-9. COMPOSITION OF CURRENT ASSETS, 1944—1952
12 MAJOR AIRFRAME COMPANIES

Year	TOTAL	Cash and Securities	Inventories	Receivables	Miscellaneous
Amount, Thousands of Dollars					
1944	$1,460,419	$389,109	$331,828	$716,720	$22,762
1945	958,656	326,799	130,906	468,542	32,409
1946	540,750	177,766	237,069	125,481	434
1947	534,789	99,606	293,751	136,914	4,518
1948	524,752	125,782	210,320	185,325	3,325
1949[a]	541,370	145,143	225,197	164,877	6,153
1949[a]	477,354	145,143	161,181	164,877	6,153
1950	574,533	133,766	208,304	227,443	5,020
1951	914,856	168,161	373,429[b]	360,164[b]	13,102
1952	1,251,178	222,083	531,020	479,506	18,569
Percent of Total					
1944	100.0	26.7	22.7	49.1	1.5
1945	100.0	34.1	13.7	48.9	3.3
1946	100.0	32.9	43.8	23.2	.1
1947	100.0	18.6	54.9	25.6	.9
1948	100.0	23.9	40.1	35.3	.7
1949[a]	100.0	26.8	41.6	30.5	1.1
1949[a]	100.0	30.5	33.7	34.5	1.3
1950	100.0	23.3	36.2	39.6	.9
1951	100.0	18.4	40.8[b]	39.4[b]	1.4
1952	100.0	17.8	42.4	38.3	1.5

[a] One company changed its accounting procedure in 1949. Current assets are therefore shown above in two ways: the first line for 1949 is directly comparable with preceding years; the second line for 1949 is based on the new accounting procedure and is therefore not comparable with preceding years.

[b] Revised.

Source: Aircraft Industries Association, data taken from individual company reports.

TABLE 4–10. BALANCE SHEET COMPARISONS, 12 MAJOR AIRFRAME COMPANIES 1947–1952

(Thousands of Dollars)

	1947	1948	1949	1950	1951[c]	1952
Assets						
Current assets:						
Cash	$ 99,350	$ 87,187	$109,365	$106,560	$ 159,676	$ 216,470
Restricted cash	256	[a]	[a]	[a]	[a]	[a]
Securities	—	38,595	39,778	27,206	8,484	5,613
Receivables	136,914	185,325	165,877	227,443	360,165	479,506
Inventories	293,751	210,320	161,181[b]	208,304	373,429	531,020
Miscellaneous	4,518	3,325	6,153	5,020	13,102	18,569
Total current assets	$534,789	$524,752	$477,354[b]	$574,533	$ 914,856	$1,251,178
Total net plant	73,958	70,093	69,333	82,844	124,457	154,010
Postwar tax refund	—	9,648	—	—	—	—
Investments	11,195	8,536	6,257	6,567	9,264	9,531
Development, etc., expenses	1,052	1,085	201	—	—	1,780
Deferred charges	7,477	5,644	4,557	4,745	13,271	11,932
Miscellaneous	9,619	1,290	12,478	12,743		
Total assets	$638,090	$621,048	$570,180[b]	$681,432	$1,061,848	$1,428,431
Liabilities						
Current liabilities:						
Payables	$119,959	$ 98,423	$ 68,415	$121,124	$ 369,910	$ 541,006
Accruals—taxes—renegotiation—refunds due U. S.	60,600	66,911	88,916	113,860	209,048	297,102
Advances—contracts deposits	101,303	101,073	53,764[b]	39,999	48,087	91,550
Reserve	—	11,598	6,904	6,206	4,923	3,618
Miscellaneous	1,614	1,919	3,827	5,624	8,474	9,577
Total current liabilities	$283,476	$279,924	$221,826[b]	$286,813	$ 640,442	$ 942,853
Bank loans, etc.	21,251	21,716	10,511	12,722	27,782	30,763
Contingency reserve	22,256	1,883	1,150	—	—	500
Capital stock	27,619	57,214	57,414	61,939	66,164	94,831
Capital (paid) surplus	60,685	56,083	59,914	62,561	61,371	68,927
Earned surplus	226,175	202,476	215,408	255,516	260,828	283,366
Miscellaneous	(3,372)	1,752	3,957	1,881	5,261	7,191
Total liabilities	$638,090	$621,048	$570,180	$681,432	$1,061,848	$1,428,431
Net current assets	$251,313	$244,828	$255,528	$287,720	$ 274,414	$ 308,325

Figures in parentheses indicate deficits.

[a] Restricted cash is included in "cash."

[b] To make this figure comparable to the figures of preceding years it has to be increased by $64,016,000 to allow for changes in the accounting practice of one company.

[c] Revised.

Source: Aircraft Industries Association, compiled from individual company reports.

TABLE 4-11. STOCKHOLDERS' CAPITAL RATIOS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952

	1937	1938	1939	1940	1941	1942	1943
Net worth (in thousands of dollars):							
Capital stock	$16,981	$17,617	$20,807	$23,225	$ 22,806	$ 26,729	$ 27,401
Capital (paid) surplus	21,290	26,557	27,965	29,185	48,775	54,141	55,455
Earned surplus	4,239	8,359	19,426	37,922	74,772	119,488	155,717
Contingency reserve	492	1,759	893	1,450	12,809	45,969	87,845
Total net worth	$43,002	$54,292	$69,091	$91,782	$159,162	$246,327	$326,418
Percent net worth to:							
Sales	69.6	61.4	49.1	37.1	19.6	8.8	6.3
Inventories	286.5	330.0	145.2	64.6	45.9	58.1	75.2
Total assets	65.5	73.3	52.7	19.5	19.7	17.5	17.3
Percent.							
Net current assets to net worth	49.7	56.8	54.4	71.9	50.5	49.9	79.3
Net income[a] to net worth	5.3	14.8	21.1	34.6	37.7	24.6	22.3

[a] A major portion of the income under military contracts is subject to renegotiation. Many contracts are subject to price redetermination. All recent profit statements are therefore tentative only.

[b] This figure is based on a change in accounting procedure of one company and therefore not comparable with previous years. If calculated on the same basis as for previous years the figure would be 145.7.

[c] This figure is based on a change in the accounting procedure of one company and therefore not comparable with previous years. If calculated on the same basis as for previous years the figure would be 52.7.

[d] 1950 revised.

[e] 1951 revised.

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-11. STOCKHOLDERS' CAPITAL RATIOS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952

1944	1945	1946	1947	1948	1949	1950[d]	1951[e]	1952
$ 26,816	$ 30,378	$ 27,629	$ 27,619	$ 57,214	$ 57,414	$ 61,939	$ 66,164	$ 94,831
53,092	55,545	56,259	60,685	56,083	59,914	62,561	61,371	68,927
178,529	251,195	263,661	226,175	202,476	215,408	255,516	260,828	283,366
126,344	86,683	35,727	22,256	1,883	1,150	.....	.....	500
$384,781	$423,801	$383,276	$336,735	$317,656	$333,886	$380,016	$388,363	$447,624
6.7	10.7	73.9	61.8	37.7	29.5	27.4	19.6	12.0
116.0	323.7	161.7	114.6	151.0	207.1[b]	182.4	104.0	84.3
23.6	41.5	60.8	52.8	51.1	58.5[c]	55.8	36.6	31.3
58.5	86.5	81.3	74.6	77.1	76.5	75.7	70.7	68.9
15.2	15.9	nil	nil	.8	10.8	16.5	8.0	18.3

TABLE 4-12. NET PROFIT AS PERCENT OF SALES, Seven Selected Industries, 1941–1952 (After Taxes)

Industry	1941	1942	1943	1944
Nonferrous Metals	12.3	12.1	9.0	8.6
Petroleum Products	10.1	7.4	6.8	7.0
Autos and Trucks	6.6	5.2	3.2	3.1
Railway Equipment	6.6	3.2	3.1	3.1
Iron and Steel	6.2	3.4	2.8	2.6
AIRCRAFT AND PARTS	7.4	3.2	1.8	1.2
Total Manufacturing	6.5	4.3	3.6	3.3

Source: National City Bank of New York, "Economic Conditions," April of each year, 1942-1953.

TABLE 4-13. NET PROFIT AS PERCENT OF SALES, 12 MAJOR AIRFRAME COMPANIES, 1937—1952

Year	Percent
1937	3.7
1938	9.1
1939	10.3
1940	12.9
1941	7.4
1942	2.2
1943	1.4
1944	1.0
1945	1.7
1946	(2.1)[a]
1947	(7.7)[a]
1948	0.3
1949[b]	3.2
1950[b]	4.5
1951[b]	1.6
1952[b]	2.2

Figures in parentheses indicate loss.

[a] Excludes special income credits (portion of reserves for contingencies provided in former years and no longer required).

[b] A major portion of the income under military contracts is subject to renegotiation. Many contracts in progress are subject to price redetermination. All profit statements are therefore tentative only.

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-12. NET PROFIT AS PERCENT OF SALES, Seven Selected Industries, 1941–1952 (After Taxes)

1945	1946	1947	1948	1949	1950	1951	1952
6.4	10.2	12.4	11.7	8.2	9.8	8.8	7.7
7.0	9.4	11.1	12.9	9.9	10.8	11.5	10.5
4.5	3.6	6.4	7.4	8.9	8.9	5.2	5.5
3.9	6.0	6.1	5.4	4.4	5.5	4.8	3.8
3.0	5.6	6.2	6.7	7.2	8.1	5.8	5.0
1.2	0.5	4.0	1.4	3.3	4.5	2.2	2.4
3.9	6.0	7.1	7.5	6.8	7.7	6.2	5.4

TABLE 4-14. SOME SIGNIFICANT SALES COMPARISONS, 12 MAJOR AIRFRAME COMPANIES, 1937—1952[a]

Year	Sales to Company-Owned Net Property[b] Percent	Sales to Company-Owned Total Assets Percent	Ratio Sales to Company-Owned Inventories	Ratio Sales to Receivables
1937	403.6	94.1	4.1	3.1
1938	530.1	119.6	5.4	6.0
1939	601.8	107.5	3.0	11.0
1940	454.1	52.5	1.7	5.1
1941	736.8	100.8	2.3	5.0
1942	3,010.9	197.9	6.6	5.4
1943	5,022.3	276.7	12.0	6.7
1944	8,250.2	354.2	17.4	8.0
1945	14,499.4	388.3	30.3	8.5
1946	1,063.3	82.4	2.2	4.1
1947	736.9	85.4	1.9	4.0
1948	1,203.3	135.8	4.0	4.6
1949[c]	1,632.2	178.5	5.0	6.8
1949[d]	1,632.2	198.5	7.0	6.8
1950	1,675.6	203.7	6.7	6.1
1951	1,590.4	186.4	5.3[e]	5.5[e]
1952	2,422.6	261.2	7.0	7.8

[a] First three columns exclude Government-owned assets.
[b] Gross property less accrued depreciation.
[c] Computed on the same basis as in preceding years.
[d] Computed on the basis of a changed accounting practice of one company and therefore not strictly comparable with previous years.
[e] Revised.

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-15. EARNINGS, DIVIDENDS, AND PRICE RANGE OF STOCK 12 MAJOR AIRFRAME COMPANIES, 1937—1952[a]

Year	Average Earnings Per Share	Average Dividend	Percent Dividend of Earnings	Average High Price[b]	Average Low Price[b]
1937	$0.26	$0.12	46.2	$23	$15-1/8
1938	0.90	0.46	51.1	25-½	9-¼
1939	1.45	0.90	62.1	31-1/8	15-3/8
1940	2.72	1.10	40.4	29-5/8	16-5/8
1941	4.86	1.49	30.7	22-3/8	14
1942	5.63	1.70	30.2	20-7/8	14-½
1943	5.87	1.56	26.6	16-3/8	10-¼
1944	4.71	1.55	32.9	19-¼	11
1945	5.08	1.39	27.4	29	15
1946	(0.80)[c]	1.61	N. App.	29-3/8	15
1947	(3.09)[c]	0.44	N. App.	17-7/8	11
1948	0.16	0.72	450.0[d]	18-7/8	11
1949	2.37	1.26	53.2	15-5/8	10-3/8
1950	3.85	1.47	38.2	24-½	13-½
1951	1.68	1.36	81.0[e]	25-5/8	17-3/8
1952	3.98	1.41	35.4[f]	24	18-1/8

N. App.—Not Applicable.

Figures in parentheses indicate loss.

[a] On the basis of weighted averages.

[b] No allowance is made for stock splits.

[c] Excluding special income credits (portions of reserves for contingencies provided in former years and no longer required as reserves).

[d] Dividends were paid by only nine of the ten companies which reported net profits. The dividends paid by these companies were only 37 percent of their earnings. The companies reporting losses paid no dividends.

[e] Dividends were paid by only 10 of the 11 companies which reported net profits. The dividends paid by these companies were only 50 percent of their earnings.

[f] Dividends were paid by only 11 of the 12 companies which reported net profits. The dividends paid by these companies represented 34.6 percent of their earnings.

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944-1952 taken from individual company reports and stock transaction data.

TABLE 4-16. OPERATING EXPENSES AS PERCENT OF NET SALES
12 MAJOR AIRFRAME COMPANIES, 1937—1952

Year	Net Sales (thousands)	Operating Expenses (thousands)	Percent, Operating Expenses to Net Sales
1937	$ 61,764	$ 56,528	91.5
1938	88,467	77,833	88.0
1939	140,955	119,192	84.6
1940	247,376	200,757	81.2
1941	812,607	634,555	78.1
1942	2,788,882	2,409,009	86.4
1943	5,209,019	4,437,250	85.2
1944	5,766,292	5,402,469	93.7
1945	3,965,303	3,714,237	93.7
1946	518,988	562,450	108.4
1947	545,014	642,765	117.9
1948	843,433	819,660	97.2
1949	1,131,679	1,074,925	95.0
1950	1,388,167	1,285,919	92.6
1951	1,979,331	1,885,410	95.3
1952	3,731,069	3,509,283	94.1

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-17. CURRENT ASSETS
12 MAJOR AIRFRAME COMPANIES, 1937—1952

Year	Ratio Current Assets to Current Liabilities	Cash and Securities to Current Assets, Percent	Net Current Assets to Sales, Percent	Net Current Assets to Inventories, Percent
1937	2.0	17.6	34.6	142.7
1938	2.7	35.1	34.9	187.3
1939	1.6	37.9	26.6	79.0
1940	1.2	46.4	26.7	46.4
1941	1.1	23.2	9.9	23.2
1942	1.1	25.1	4.4	29.0
1943	1.2	27.6	5.0	59.6
1944	1.2	28.0	3.9	67.8
1945	1.6	34.1	9.2	279.9
1946	2.4	32.9	60.1	131.5
1947	1.9	18.6	46.1	85.6
1948	1.9	24.0	29.0	116.4
1949[a]	1.9	26.8	22.6	113.4
1949[b]	2.2	30.4	22.6	158.5
1950	2.0	23.3	20.7	138.1
1951	1.4	18.4	13.9	73.5[c]
1952	1.3	17.7	8.3	58.1

[a] Computed on the same basis as in preceding years.
[b] Computed on the basis of a changed accounting practice of one company and therefore not comparable with previous years.
[c] Revised.
Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938-1944 editions). Data for 1944 to 1952 taken from individual company reports.

TABLE 4-18. NET FEDERAL TAXES AS PERCENT OF TOTAL INCOME, 12 MAJOR AIRFRAME COMPANIES, 1937—1952

Year	Percent
1937	26.5
1938	21.9
1939	19.8
1940	26.9
1941	59.5
1942	72.6
1943	72.0
1944	71.7
1945	57.5
1946	Not applicable
1947	Not applicable
1948	82.3
1949	37.5
1950	43.7
1951	68.6
1952	62.9

Source: Aircraft Industries Association, compiled from Moody's Industrial Manuals (1938–1944 editions). Data for 1944 to 1952 taken from individual company reports.

CHAPTER V

MILITARY AVIATION

Only five years after the hasty demobilization that followed World War II, the United States began an air power buildup designed to re-create military air strength for what was later called "an age of peril."

Under the impetus of war in Korea, and in the recognition that the Soviet Union possessed atomic capabilities, long-range objectives of the military were five-fold:

(1) To achieve strength adequate to deter Soviet aggression.

(2) To provide the capability for a powerful and sustained retaliatory offensive if such aggression should nevertheless occur.

(3) To achieve the ability to detect and destroy as many attacking aircraft and guided missiles as possible in event of attack on the United States or its free world allies.

(4) To create adequate reserves of equipment and personnel for commitment in the early and decisive stages of any possible future conflict.

(5) To build a mobilization base for rapid expansion of the military services and of their supporting industries under emergency conditions.

Postwar Decline in Military Strength

The outbreak of the Korean War found the military air services of the United States at strength levels below those required by the nation's global responsibilities.

The precipitate demobilization which came on the heels of victory over Japan in 1945 ran counter to plans made by all the services for reducing the armed forces in an orderly fashion to levels considered the minimum allowable for national security.

Military plans were for 70 peacetime Air Force groups and proportionate Naval air strength. The headlong demobilization of 1945 and 1946, however, decimated the nation's air arms—and by 1946 the Air Force did not have even one operational group ready to defend the United States.

The Air Power Reports

In 1947, the National Security Act gave air power equal organizational status with naval and land power.

In that year, too, the President—recognizing the peril to the nation of air weakness—appointed a commission of outstanding citizens to make

recommendations ". . . so broad in scope and purpose that they will assist in revising old policies and in framing new ones, and will serve as a guide for formulating a carefully considered national air policy." At the same time, a Congressional Aviation Policy Board came into being for the same purposes.

When their studies were published early in the following year, the nation had two primary documents, differing only in detail, that attested to the undeniable first-rank importance of aviation in the protection of the United States. The report of the President's Air Policy Commission called for an immediate buildup of the Air Force to 70 groups by January 1, 1950, and for adequate appropriations to modernize Naval aviation. Three months later, the Congressional Aviation Policy Board reached similar conclusions.

Both groups dealt at length with related problems that had long plagued the diverse elements in aviation. Aircraft production for the government has always been a stop-and-go proposition. The President's Air Policy Commission pointed out that a five-year procurement plan could save up to 20 percent or 25 percent in production costs, and recommended a series of five-year purchasing plans. The Congressional Board concurred. Both groups called for the development and construction of early-warning radar networks, a satisfactory airport program, and better navigational and weather reporting facilities. Together, these reports alerted the public to the abyss into which aviation had fallen.

The Congressional Board said:

"It is the judgment of the Congressional Aviation Policy Board that the capability of the United States most likely to discourage an aggressor against attack upon this nation, most effective in thwarting such an attack if launched, and most able to deal out retaliation to paralyze further attack, is air power."

Air Power Funds Appropriated, Impounded

In the spring of 1948, the Supplemental National Defense Appropriation Act of 1948 was passed, providing funds to step up aircraft procurement, research, development and operations. The industry received new orders, designed to raise the nation's military air strength, but as 1948 rounded into 1949 a sizable proportion of the funds was impounded by Executive action—and many contracts were cancelled.

The Limited Mobilization

The great debate over air power was resolved less by agreement on principles than by the exigency of war—the North Korean attack across the 38th Parallel. As the buildup got underway under the lash of war

in Korea, the military forces and the aircraft industry faced a multitude of problems that had not existed a decade earlier. The developments that grew out of World War II, and reached maturity in the years just after it had to do with atomic energy, jet and rocket propulsion, guided missiles and the new science of electronics. As continuing advances were made in solving these new aeronautical problems, it became apparent that air arms capable of stopping attacks and delivering A- and H-bombs to the heart of the enemy must be maintained in America so long as the threat of war exists.

The Cost of Military Air Power

About ten cents of every dollar's worth of goods and services which this country produces goes to military aviation. The determination of the size of each fiscal year's appropriations, and of the manner in which these funds will be spent, is a time-consuming and complicated process.

The roles, missions and responsibilities of the miltiary services result from studies of the Joint Chiefs of Staff, following which the individual services determine the number of planes, airfields, personnel and other equipment required to accomplish these objectives.

With requirements determined, an estimate of financial cost is assigned to each of the force levels—and the development of these dollar amounts results in the detailed defense budget.

Months of military hearings, within the Services and the Department of Defense, follow—during which the budget is explained, defended, cut, adjusted, and changed. It is then presented by the President of the United States to the Congress.

At this point, additional hearings begin in Congress before Subcommittees and Committees; Conference Committees compromise differences between House and Senate. Finally, an Appropriations Bill is passed by the Congress. The amount finally appropriated frequently differs substantially from the amounts originally requested by the Services. In such cases, the Services must then re-program to operate within the limitations set by available funds.

Money appropriated in any one year usually must be "obligated" (although not necessarily spent) in the same fiscal year. With long lead-time items such as military aircraft, it is normal for expenditures to follow obligations by two to three years.

Organizations of Wings, Air Groups

Air Force: The basic organizational unit of the United States Air Force is the "wing." A wing is comprised of a combat group and necessary administrative and service units. The number of airplanes in a

wing depends on its mission; for example, a group of heavy bombers has 30 planes, a medium bomber group has 45, a light bomber group 48, a day fighter group 75, an all-weather fighter group 63. The USAF also operates separate squadrons for rescue, support and in-flight refueling.

Navy and Marines: Navy carrier air groups usually are composed of four fighter and one attack squadrons, and another unit comprising night fighters, minelaying aircraft, helicopters and other aircraft. Large battle carriers (C-VB's) have a complement of about 117 aircraft. Smaller Essex-class carriers (CV's) have about 91. Antisubmarine squadrons attached to light and escort carriers average about 23 aircraft and shore-based patrol squadrons have nine planes each. Marine fighter squadrons are assigned 24 aircraft.

Army: The United States Army has lightweight liaison aircraft and helicopters in its table of equipment for support of ground units. In 1952, the Army was reported to have about 1,600 planes and was planning to receive delivery on 1,000 to 1,500 light aircraft per year.

TABLE 5–1. APPROPRIATIONS AND EXPENDITURES FOR MILITARY AVIATION 1899–1953
(Millions of Dollars)

Fiscal Year	U. S. Air Force[a]		Naval Aviation	
	Total Cash Appropriations	Expenditures	Total Cash Appropriations	Expenditures
1899	$ .05[b]	N.A.	$ —	N.A.
1909	.03[c]	N.A.	—	N.A.
1912	.12	N.A.	.03	N.A.
1913	.10	N.A.	.01	N.A.
1914	.17	N.A.	.01	N.A.
1915	.20	N.A.	.01	N.A.
1916	.80	N.A.	1.0	N.A.
1917	18.7[d]	N.A.	3.8	N.A.
1918	735.0[d]	N.A.	61.5	N.A.
1919	952.3[d]	N.A.	220.4[e]	N.A.
1920	28.1	N.A.	25.7	N.A.
1921	35.1	$ 30.9	20.0	N.A.
1922	25.6	23.1	19.1	$ 14.3
1923	13.1	18.1	14.8	14.2
1924	12.6	11.0	14.7	14.3
1925	13.5	11.7	15.7	15.5
1926	15.9	14.9	18.2	18.1
1927	15.3	16.8	22.4	22.0
1928	21.1	19.4	20.3	19.8
1929	28.9	23.3	32.3	32.1
1930	34.9	28.1	31.6	31.1
1931	38.9	38.7	32.1	31.0
1932	31.9	33.0	31.2	31.7
1933	25.7	22.1	25.4	31.2
1934	31.0	17.6	29.8	15.5
1935	27.9	20.5	32.1	17.2
1936	45.6	32.2	40.8	20.5
1937	59.6	41.3	38.9	27.5
1938	58.9	51.1	51.6	59.8
1939	71.1	83.4	48.2	47.9
1940	186.6	108.5	111.8	50.8
1941	2,173.6	605.9	453.0	193.6
1942	23,049.9	2,555.2	6,190.0	993.1
1943	11,317.4	9,392.4	5,258.0[f]	3,966.4

TABLE 5-1. APPROPRIATIONS AND EXPENDITURES FOR MILITARY AVIATION 1899–1953—*Continued*
(Millions of Dollars)

Fiscal Year	U. S. Air Force[a]		Naval Aviation	
	Total Cash Appropriations	Expenditures	Total Cash Appropriations	Expenditures
1944	23,656.0	13,087.7	4,583.7[g]	4,490.1
1945	1,610.7	11,357.4	2,539.6[h]	5,166.0
1946	.5	2,519.4	795.0[h]	1,065.7
1947	1,200.0	854.3	770.8	749.1
1948	608.1\ 829.8/[i]	1,199.1	906.0	747.9
1949	939.8	1,830.7	588.3	875.1
1950	4,139.4	3,669.1	1,041.5	989.4
1951	15,791.1	6,549.4	3,815.3	1,237.3
1952	22,714.0	13,184.2	5,266.5	2,205.2
1953	22,318.4	14,600.0[j]	4,873.0	3,061.3

N.A.—Not available.

[a] Army Air Corps through September 18, 1947; U. S. Air Force thereafter.

[b] Allotted to Dr. S. P. Langley for experiments in aerodynamics.

[c] Allotted to pay for Wright airplane which completed tests in 1909.

[d] Of the 1917–1919 appropriations $490,515,060.14 were revoked by Act of Congress and $290,479,474.98 expired by limitation of law. (Col. Edgar S. Gorrell at Supplemental Military Appropriations Bill for 1940, Hearings, House of Representatives, May 18, 1939, pp. 293, 294.)

[e] In 1919, $119,444,162 reverted to the Treasury as unexpended.

[f] First rescission—$450,412,046.

[g] First rescission—$811,987,405.

[h] Appropriation figures for fiscal years 1945 and 1946 have been adjusted to reflect all transfers and rescissions. (BuAer letter of May 20, 1948.)

[i] FY 1949 Construction of Aircraft and Related Procurement appropriation enacted in FY 1948.

[j] Estimate.

Sources: Air Force: 1899–1953: Letters, Directorate of Statistical Services, USAF, dated April 30, 1952 and July 31, 1953.
Navy: 1912–1921: Aircraft Industries Association, "Aviation Facts and Figures, 1945," p. 53.
1922–1953: Letter, Director of Fiscal Division, Bureau of Aeronautics, dated March 28, 1952, and letter, Bureau of Aeronautics, September 1, 1953.

TABLE 5-2. ARMY AIR FORCES LOSSES[a]
December 7, 1941–August 1945

	Number of Airplanes
TOTAL	65,164
On combat missions	22,948
Overseas—not on combat missions[a]	20,633
In Continental United States	21,583

[a] Includes losses suffered enroute to and from overseas, Air Transport Command foreign divisions and other overseas commands.

Source: Army Air Force Statistical Control Division, letters of February 12, 1945 and April 24, 1945.

TABLE 5–3. TOTAL FEDERAL EXPENDITURES AND EXPENDITURES FOR MILITARY AIRCRAFT AND RELATED PROCUREMENT

1922–1953

(Dollar Figures in Millions)

Fiscal Year	Total Federal Expenditures[a]	Total Expenditures: Army, Navy, & Air Force	Expenditures for Aircraft and Related Procurement	Percent Aircraft & Related Procurement of Total Federal	Percent Aircraft & Related Procurement of Army, Navy, & Air Force
1922	$ 3,373	$ 935	$ 6	.2	.6
1923	3,295	730	7	.2	1.0
1924	3,049	689	10	.3	1.5
1925	3,063	717	10	.3	1.4
1926	3,098	677	12	.4	1.8
1927	2,974	688	14	.5	2.0
1928	3,103	732	22	.7	3.0
1929	3,299	791	29	.9	3.7
1930	3,440	839	31	.9	3.7
1931	3,652	832	31	.8	3.7
1932	4,535	834	29	.6	3.5
1933	4,623	784	25	.5	3.2
1934	6,694	706	13	.2	1.8
1935	6,521	924	23	.4	2.5
1936	8,493	1,147	44	.5	3.8
1937	7,756	1,185	58	.7	4.9
1938	6,938	1,240	67	1.0	5.4
1939	8,966	1,368	68	.8	5.0
1940	9,183	1,799	205	2.2	11.4
1941	13,387	6,252	587	4.4	9.4
1942	34,187	22,905	2,915	8.5	12.7
1943	79,622	63,414	10,072	12.6	15.9
1944	95,315	75,976	12,828	13.5	16.9
1945	98,703	80,537	11,521	11.7	14.3
1946	60,703	43,151	1,649	2.7	3.8
1947	39,289	14,769	593	1.5	4.0
1948	33,791	11,983	703	2.1	5.9
1949	40,057	13,988	1,248	3.1	8.9
1950	40,156	13,440	1,705	4.2	12.7
1951	44,633	20,821	2,536	5.7	12.2
1952	66,145	38,574	5,718	8.6	14.8
1953	74,607	42,600[b]	8,178	11.0	19.2

[a] Excludes debt retirements and beginning 1933, refunds of receipts and capital transfers.

[b] Estimate.

Sources: Federal and Military: 1922–1932—Bureau of Census, "Historical Statistics of the United States, 1789–1945", p. 299.

1933–1951—Bureau of Census, "Statistical Abstract of the United States, 1952", p. 306.

1952–1953—Bureau of the Budget, Estimates Division; "The Budget of the U. S. Government, 1954", p. 562; Senate Subcommittee Hearings on the Department of Defense Appropriations for 1954, p. 594.

Aircraft and Related Procurement: 1922–1953—Bureau of Aeronautics letters, March 28, 1952 and September 1, 1953; U. S. Air Force letters, April 30, 1952 and July 31, 1953.

Percentages calculated by Aircraft Industries Association.

TABLE 5–4. APPROPRIATIONS AND EXPENDITURES FOR AIRCRAFT AND RELATED PROCUREMENT
1922–1953
(Millions of Dollars)

Fiscal Year	U. S. Air Force[a]		Bureau of Aeronautics	
	Appropriations	Expenditures	Appropriations	Expenditures
1922	$ 4.5	$ 5.3	$ 5.3	$ 1.0
1923	2.1	3.0	6.5	4.1
1924	2.6	3.0	5.8	7.3
1925	3.6	4.6	5.3	5.3
1926	6.6	7.0	8.2	5.0
1927	7.6	7.8	12.4	6.0
1928	11.1	10.6	8.7	11.3
1929	12.8	13.5	18.3	15.8
1930	13.9	16.3	15.2	14.4
1931	17.6	17.6	14.8	13.2
1932	15.3	15.4	13.5	13.5
1933	11.5	11.4	8.7	13.1
1934	15.8	9.0[b]	12.2	4.3
1935	10.1	12.4	19.0	10.3
1936	30.0	29.9	26.7	14.2
1937	41.3	40.0	21.0	18.3
1938	39.8	39.8	27.3	27.3
1939	43.6	43.4	25.4	24.2
1940	178.0	180.7	69.4	24.0
1941	3,423.6	442.0	363.9	144.8
1942	17,881.4	2,102.6	5,654.0	812.7
1943	7,837.0	7,020.0	3,871.4[c]	3,052.0
1944	20,417.3	9,562.6	2,594.1	3,265.3
1945	1,610.2	7,904.9[d]	1,101.8[e]	3,616.4[e]
1946	[f]	1,464.7	83.2	184.2[e]
1947	435.3	332.9	310.8	260.2
1948	839.2	529.8	405.0	173.1
1949	0	924.8	0	322.8
1950	1,100.0	1,255.7	322.8	449.3
1951	7,292.0	1,945.0	2,880.6	590.9
1952	11,882.4	4,389.0	4,333.0	1,328.5
1953	12,685.0	6,050.0[g]	3,910.4	2,127.5

[a] Army Air Corps through September 18, 1947; U. S. Air Force thereafter.

[b] Includes $7,500,000 from PWA. Most of the regular appropriations reverted to Treasury.

[c] First rescission—$450,412,046.

[d] Funds drawn largely from appropriations of prior years.

[e] "It will be noted that the appropriation figures for FY 1945 and 1946 have been adjusted to reflect all transfers and rescissions. Expenditure figures likewise reflect adjustments to agree with the official records of this bureau, which are maintained on a checks issued basis." Letter of May 20, 1948, Director of Fiscal Division, Bureau of Aeronautics.

[f] Token appropriation of $100 was made.

[g] Estimate.

Sources: U. S. Air Force, Letters, Director of Statistical Services, dated April 30, 1952, and July 31, 1953. Bureau of Aeronautics, Letters, Director of Fiscal Division, dated March 28, 1952 and September 1, 1953.

TABLE 5–5. PERSONNEL IN THE UNITED STATES AIR FORCE
1912–1951

As of June 30	TOTAL	Officers	Aviation Cadets	Airmen
1912[a]	51	12	—	39
1913[b]	114	23	—	91
1914	122	18	—	104
1915	208	31	—	177
1916	311	63	—	248
1917[c]	1,218	131	—	1,087
1918[d]	195,023	20,708	—	174,315
1919	25,603	4,219	—	21,384
1920	9,050	969	—	8,081
1921	11,649	975		10,674
1922	9,642	958	113	8,571
1923	9,441	917	77	8,447
1924	10,547	884	119	9,544
1925	9,670	916	103	8,651
1926	9,674	954	142	8,578
1927	10,078	1,001	125	8,952
1928	10,549	1,055	280	9,214
1929	12,131	1,289	403	10,439
1930	13,531	1,499	378	11,654
1931	14,780	1,590	418	12,772
1932	15,028	1,659	325	13,044
1933	15,099	1,599	238	13,262
1934	15,861	1,545	318	13,998
1935	16,247	1,529	363	14,355
1936	17,233	1,593	328	15,312
1937	19,147	1,861	166	17,120
1938	21,089	2,179	342	18,568
1939	23,455	2,631	633	20,191
1940	51,165	3,361	1,894	45,910
1941	152,125	10,611	8,627	132,887
1942	764,415	55,956	50,213	658,246
1943	2,197,114	205,874	99,672	1,891,568
1944	2,372,292	333,401	82,647	1,956,244
1945	2,282,259	381,454	16,764	1,884,041
1946	455,515	81,733	7	373,775
1947	305,827	42,745	53	263,029
1948	387,730	48,957	1,338	337,435
1949	419,347	57,851	1,860	359,636
1950	411,277	57,006	2,186	352,085
1951	788,381	107,099	2,476	678,806
1952	978,000	131,000	9,000	838,000
1953	973,000	128,000	7,000	838,000

[a] As of November 1.
[b] As of September 30.
[c] As of April 6.
[d] As of November 11.

Source: 1912–1951: U. S. Air Force, Directorate of Statistical Services, Letter of July 31, 1953.
1952–1953: U. S. Air Force, Office of Public Information.

Note: Hanson W. Baldwin estimates that the Air Force had a total personnel of about 980,000 in the summer of 1953 ("New York Times," August 4, 1953, p. 5).

TABLE 5-6. AIRFRAME WEIGHT OF U. S. MILITARY PLANES, BY TYPE, 1944 AND 1953
(Pounds)

Type	1944	1953
Heavy bombers	49,000	100,000
Medium bombers	10,100–24,700	55,000
Light bombers	7,800–14,700	30,000
Fighters—day	5,000	7,000–11,000
Fighters—all weather	10,000	9,000–15,000
Heavy transports	20,100–61,800	70,000
Medium transports	7,800–16,400	50,000
Light transports	2,300– 3,800	19,000–25,000
Trainers	600–16,800	1,000–20,000

Source: 1944: Computed by Aircraft Industries Association, Research and Statistics Service, from Aircraft Resources Control Office, "Model Designations of Military Aircraft," revised, December 1944.
1953: Aircraft Industries Association.

TABLE 5-7. AIRPLANES ON HAND
U. S. AIR FORCE[a]
1939–1950

As of December 31	TOTAL	Tactical	Trainers	Transports	Other Non-Tactical[b]
1939	2,546	1,647	761	131	7
1940	3,961	1,760	2,069	124	8
1941	12,297	4,477	7,340	254	226
1942	33,304	11,607	17,044	1,857	2,796
1943	64,232	27,448	26,051	6,466	4,267
1944	72,726	41,961	17,060	10,456	3,249
1945	44,782	26,077	7,617	7,500	3,588
1946	30,035	17,186	6,297	4,538	2,014
1947	23,814	13,118	5,714	3,536	1,446
1948	20,068	8,888	6,177	3,712	1,291
1949	17,222	7,863	5,811	2,839	709
1950	17,337	7,854	5,961	2,859	663

[a] Army Air Corps through September 18, 1947; U. S. Air Force thereafter.
[b] Includes tankers, search and rescue, helicopters, liaison and special research.
Sources: 1939–1950: Army Air Forces Statistical Control Division. Brought up to date by Hq., USAF, Directorate of Statistical Services, letter of July 31, 1953.
Note: Hanson W. Baldwin estimates that the Air Force had 17,690 "active inventory" aircraft first- and second-line planes and about 3,000 in reserve in August 1953. ("New York Times," August 4, 1953, p. 5.)

TABLE 5–8. AVERAGE AIRFRAME WEIGHT OF USAF ACCEPTANCES, BY TYPE
1946–1950
(Pounds, excluding spares)

Calendar Year	Bombers	Fighters and Interceptors	Reconnaissance	Transports	Trainers	Other Non-Tactical[b]
1946[a]	45,234	5,560	7,287	23,500	—	1,975
1947[a]	47,667	5,503	8,182	25,979	—	734
1948	58,675	7,563	42,333	25,690	5,800	1,887
1949	55,168	6,849	—	33,975	5,723	2,280
1950	53,349	6,821	59,238	38,718	5,312	13,655

[a] Includes USAF production for other agencies.
[b] Includes tankers, search and rescue, helicopters, liaison and special research.
Source: Hq., USAF, Directorate of Statistical Services, letter of July 31, 1953.

TABLE 5–9. WARPLANE PROGRESS SINCE THE SECOND WORLD WAR
1945 AND 1953

	May 1945	1953
Fighter.	P–51	F–86
Speed	470 mph	700 mph plus.
Range	Over 2,000 miles	Approx. 1500 miles
Fire power	Six 50-cal. guns in wings. Can carry ten 5-inch HVAR[a] with zero launchers or two 1,000-lb. bombs.	Six 50-cal. machine guns. Can carry sixteen 5-inch HVAR's or two 1,000-lb. bombs. D version equipped with twenty-four 2.75-inch rockets in lieu of machine guns.
Bomber.	B–17	B–47
Speed (approx.)	285 mph	600 mph
Range	2,500 miles	3,000 miles[b]
Fire power	Twelve 50-cal. machine guns	Two 50-cal. machine guns
Bomb load	12,800 pounds	Over 20,000 pounds

[a] High velocity aircraft rockets.
[b] Equipped for in-flight refuelling which can more than double range.
Sources: 1945: Office of the Secretary of Defense, Office of Public Information, "Releasable Information on U. S. Air Force Aircraft," pp. 2, 5, 6.
1953: Office of the Secretary of Defense, Office of Public Information.

TABLE 5–10. OPERATIONS OF ARMY AIR FORCES—SORTIES FLOWN, BOMB TONNAGE DROPPED, ENEMY AIRCRAFT DESTROYED
December 7, 1941—August, 1945

	TOTAL	vs. Germany	vs. Japan
Sorties flown (total)	2,362,800	1,693,565	669,235
Dec. 7, 1941–Dec. 31, 1942	26,900	9,749	17,151
1943	365,940	233,523	132,417
1944	1,284,195	1,012,101	272,094
1945 (Jan.–Aug.)	685,765	438,192	247,573
Bomb tonnage dropped (total)	2,057,244	1,554,463	502,781
Dec. 7, 1941–Dec. 31, 1942	10,239	6,123	4,116
1943	198,800	154,117	44,683
1944	1,085,978	938,952	147,026
1945 (Jan.–Aug.)	762,227	455,271	306,956
Enemy aircraft destroyed (total)	40,259[a]	29,916[a]	10,343[a]
Dec. 7, 1941–Dec. 31, 1942	935	327	608
1943	10,837	7,605	3,232
1944	19,442	15,664	3,778
1945 (Jan.–Aug.)	8,477	6,251	2,226

[a] Includes 568 enemy aircraft destroyed whose destruction cannot be allocated to specific months: 69 vs. Germany and 499 vs. Japan.

Source: Army Air Forces Statistical Control Division, letters of February 12, 1945 and April 24, 1945.

TABLE 5–11. BERLIN AIRLIFT OPERATIONAL STATISTICS
June 26, 1948–May 12, 1949

Total Flights	195,998
United States	132,738
British	63,260
Total Cargo and Passenger Tonnage	1,589,567
United States	1,221,281
British (Began operations June 28, 1948)	368,286
Total U. S. Hours Flown	417,628
Total U. S. Miles Flown (statute)	65,000,000
Total U. S. Ton-Miles Flown	268,000,000
U. S. Fatalities	28
Total U. S. Aircraft Assigned to Airlift	342
Total U. S. Aircraft Assigned to Corridor Flights	232
Total U. S. Aircraft In Maintenance Pipeline or in Maintenance Shops	95
Total U. S. Aircraft Assigned to Aircrew Training Pool	15

Source: National Military Establishment, Office of Public Information, Press Release No. 25–49A, dated May 13, 1949.

TABLE 5–12. BERLIN AIRLIFT MONTHLY TONNAGES FLOWN
June 26, 1948–May 10, 1949

Month	TOTAL		by United States		by British	
	Flights	Tonnages	Flights	Tonnages	Flights	Tonnages
TOTAL	193,993	1,571,721	131,371	1,207,801	62,622	363,920
1948						
June 26–July 31	14,036	70,241	8,117	41,188	5,919	29,053
August	18,048	118,634	9,796	73,632	8,252	45,002
September	19,587	138,427	12,905	101,871	6,682	36,556
October	18,082	147,038	12,139	115,793	5,943	31,245
November	13,351	112,592	9,046	87,963	4,305	24,629
December	16,489	141,456	11,655	114,572	4,834	26,884
1949						
January	19,485	171,962	14,089	139,223	5,396	32,739
February	17,094	152,250	12,051	120,404	5,043	31,846
March	22,157	196,166	15,530	154,480	6,627	41,686
April	26,025	235,377	19,129	189,972	6,896	45,405
May (through 10th)	9,639	87,578	6,914	68,703	2,725	18,875

Source: National Military Establishment, Office of Public Information, Press Release No. 25-49A, dated May 13, 1949.

TABLE 5–13. U. S. AIR FORCE OPERATIONS IN KOREAN AIR WAR
July 1, 1950–July 27, 1953

	TOTAL	By USAF	By Attached Units[a]
Sorties Flown	836,877	716,979	119,898
Bomb Tonnage	448,366	N.A.	N.A.
Rounds of Ammunition	182,829,400	N.A.	N.A.
Number of Rockets	511,329	N.A.	N.A.
Gallons of Napalm	9,596,798	N.A.	N.A.
Enemy Aircraft Destroyed	1,020	—	—
U. S. Aircraft Losses.	1,000	801	199
Air-to-Air	110	104	6
Ground Fire	677	544	133
Other	213	153	60

N.A.—Not available.

[a] Includes shore-based Marines attached to Fifth Air Force, carrier-based Marine and Navy aircraft which, though not attached, took part in close support strikes with Fifth Air Force planes in the closing weeks of the war; attached Royal Australian Meteorjets, Republic of Korea and South African fighter bombers.

Source: Hqs., FEAF Press Release No. 2700, "Korean War Air Summary," dated July 31, 1953.

TABLE 5-14. AIRCRAFT ACCEPTED BY THE NAVY AND USAF
1946-1952

Calendar Year	Navy[a]		USAF	
	Number of Aircraft	Airframe Weight, Excluding Spares (Thousands of Pounds)	Number of Aircraft	Airframe Weight, Excluding Spares (Thousands of Pounds)
1946	759	4,908	650[b]	7,799[b]
1947	920	5,855	1,197[b]	5,586[b]
1948	1,149	8,485	1,055	15,821
1949	815	6,455	1,475	23,149
1950	985	9,138	1,670	26,803
1951	1,373	11,659	4,148[b]	40,000[b]
1952	2,311	19,422	6,973[b]	88,000[b]

[a] Includes USAF acceptances for Navy; excludes Navy acceptances for USAF and Army.
[b] Includes USAF acceptances for other agencies. The duplication in acceptances accounts partly for the difference between this Table and Tables 2-6 and 2-7.
Sources: Navy: Bureau of Aeronautics, letter of September 1, 1953.
USAF: 1946-1950—Hq., USAF Directorate of Statistical Services, letter of July 31, 1953.
1951-1952—House Subcommittee Hearings on Air Force Appropriations for 1954, p. 19.

TABLE 5-15. AIRCRAFT ON HAND, NAVY
1935-1952

Year[a]	Units
1935	1,456
1936	1,676
1937	1,639
1938	2,050
1939	2,098
1940	2,166
1941	5,233
1942	11,772
1943	25,588
1944	36,100
1945	29,714
1946	19,301
1947	14,976
1948	14,894
1949	14,015
1950	13,412
1951	13,213
1952	13,694

[a] As of June 30 from 1935 to 1939; As of December 31 from 1940 to 1952.
Sources: 1935-1939, Aircraft Industries Association, "Aviation Facts and Figures, 1945", p. 63.
1940-1952, Bureau of Aeronautics, letter of September 1, 1953.

TABLE 5–16. NAVY AND MARINE OPERATIONS IN KOREAN WAR
June 25, 1950–July 31, 1953

Total Sorties Flown		341,313
Total Offensive Sorties		202,953
Bombs (tons)		177,985
Rockets (number)		273,886
Ammo (thousands of rounds)		72,145
Runs on Targets		850,707
Total Sortie Hours Flown		819,554
Average Combat Crews (last 30 months of war)[a]		
On Board		641.9
Available		584.6
Enemy Aircraft Losses		
In Air		24
On Ground		74
Total Aircraft Losses		1,247
Enemy Action Aircraft Losses		564
Average No. of Operating Aircraft		614
Fighter	318	
Attack	111	
ASW (Search)	29	
Patrol	61	
Observation	10	
Helicopter	32	
Transport	20	
Utility	7	
Training	26	

[a] Where pilots were qualified in more than one type or model aircraft, adjustments were made to count pilots only in the type to which primarily assigned.

Source: Bureau of Aeronautics letter of September 1, 1953.

TABLE 5–17. NAVAL AVIATION PERSONNEL[a]
1950–1953

Year as of June 30	TOTAL	Pilots	Enlisted Aviation Rates	Aviation Ground Officers
1950	91,298	12,978	76,349	1,971
1951	162,214	18,287	139,838	4,089
1952	194,730	20,944	168,486	5,300
1953[b]	210,211	23,066	182,046	5,099

[a] Navy and Marine.

[b] As of May 31.

Source: Bureau of Naval Personnel, Military Personnel Statistics, Letter of September 1, 1953.

TABLE 5–18. MILEAGE FLOWN BY MILITARY AIR TRANSPORT SERVICE
June 1948–May 1953
(Thousands of Miles)

Year	TOTAL Ton-Miles	Passenger-and Patient-Miles		
		TOTAL	Passenger	Patient
TOTAL	1,048,620	3,930,157	3,268,954	661,203
June–Dec. 1948	78,174	304,640	280,386	24,254
Jan.–Dec. 1949	128,530	478,043	438,893	39,150
Jan.–Dec. 1950	173,559	703,320	532,904	170,416
Jan.–Dec. 1951	263,728	888,639	666,892	221,747
Jan.–Dec. 1952	285,871	1,099,868	950,853	149,015
Jan.–May 1953	118,758	455,647	399,026	56,621

Source: Military Air Transport Service, Office of Information Services, Letter dated June 30, 1953.

TABLE 5–19. PACIFIC AIRLIFT ESTIMATED OPERATIONAL STATISTICS[a]
MILITARY AIR TRANSPORT SERVICE
July 1, 1950–June 1, 1953

Total Passengers and Patients Airlifted	529,000
Passengers Airlifted	470,000
Medical Patients Airlifted (Inbound Only)	59,000
Total Tons of Cargo and Mail Airlifted	92,000
Tons Cargo Airlifted	64,000
Tons Mail Airlifted	28,000
Total Tons Airlifted (includes tons of passengers, patients, cargo and mail flown)	152,000
Trans-Pacific Crossings	33,000
Trans-Atlantic Crossings (Between U. S. and Europe and Africa)	11,000

[a] Combined Inbound and Outbound Between United States and Far East.
Source: Military Air Transport Service, Office of Information Service, Press Release R-47-53, dated June 1, 1953.

TABLE 5-20. PASSENGERS, PATIENTS, AND TONS CARRIED, MILITARY AIR TRANSPORT SERVICE
June 1948–April 1953

Year	Passengers	Patients	Cargo and Mail Tons	Total Tons
TOTAL	1,624,097	238,508	310,814	516,662
June 1948–Dec. 1951.....	980,972	157,028	199,000	326,000
Jan. 1952–Dec. 1952.....	495,491	62,352	85,922	147,720
Jan. 1953–April 1953.....	147,634	19,128	25,892	42,942

Source: Military Air Transport Service, Office of Information Services, Letter dated June 30, 1953

TABLE 5-21. CIVIL AIR PATROL: FLYING OPERATIONS
1951, 1952

	1951	1952
Flying hours on all types of missions.....	N.A.	100,687
Flying hours on actual searches.....	9,108[a]	8,901[b]
Flying hours on SARCAPS[c].....	5,994	8,925
Flying hours on Civil Defense support missions.....	N.A.	676[d]
Flying hours on Ground Observer Corps missions.....	N.A.	3,349[e]
Flying hours on flight orientation for CAP Cadets.....	47,608	63,463
Flying hours on special missions entailing administrative and logistic support.....	N.A.	14,842
Flying hours on miscellaneous missions for Red Cross, state and local agencies.....	N.A.	531

N.A.—Not available.
[a] 95 actual searches.
[b] 111 actual searches.
[c] State-wide search and rescue training missions supervised by Air Rescue Service. Each of 52 State Wings has at least one SARCAP. Some of the larger ones have more.
[d] 16 missions.
[e] 107 missions.
Source: Civil Air Patrol, "Annual Report of the Civil Air Patrol," 1952, p. 17.

TABLE 5-22. CIVIL AIR PATROL
TOTAL OF ALL UNITS AND PERSONNEL
1951, 1952

	As of December 31, 1951	As of December 31, 1952
Wings	52	52
Groups	160	210
Squadrons	1,376	1,722
Cadets	42,945	48,276
Senior Members	34,467	29,196

Source: Civil Air Patrol, "Annual Report of the Civil Air Patrol", 1952, p. 17.

TABLE 5-23. U. S. AIR FORCE: FATAL AIRCRAFT ACCIDENT RATES[a]
1921-1953

Fiscal Year	Rate per 10,000 Hours of Aircraft Flight	Fiscal Year	Rate per 10,000 Hours of Aircraft Flight	Calendar Year	Rate per 10,000 Hours of Aircraft Flight
1921	5.82	1933	.65	1946	.75
1922	3.68	1934	.94	1947	.58
1923	5.02	1935	.73	1948	.54
1924	2.35	1936	.81	1949	.52
1925	2.00	1937	.52	1950	.55
1926	1.70	1938	.63	1951	.55
1927	1.99	1939	.44	1952	.50
1928	1.37	1940	.47	1953[b]	.49
1929	1.63	1941	.52		
1930	1.14	1942	.77		
1931	.53	1943	.82		
1932	.86	1944-5	N.A.		

N.A.—Not available.
[a] Combat losses not included
[b] First four months.
Sources: 1921-1943: Army Air Forces, Office of Flying Safety, Research and Statistics Division quoted in Office of War Information, Press Release NB-1967, Jan. 16, 1944, p. 14.
1946-date: Letter from Deputy Director of Inspection Service, U. S. Air Force, June 12, 1953.

TABLE 5–24. U. S. NAVY: FATAL AIRCRAFT ACCIDENT RATES[a]
1936–1951

Fiscal Year	Rate per 10,000 Hours of Aircraft Flight	Fiscal Year	Rate per 10,000 Hours of Aircraft Flight
1936	.52	1945	1.10
1937	.48	1946	.82
1938	.57	1947	.73
1939	.52	1948	.62
1940	.30	1949	.43
1941	.58	1950	.49
1942	.80	1951	.58
1943	1.00		
1944	1.07		

[a] Combat losses not included.
Source: Department of the Navy, Appropriations for 1953, part 1, Hearings, House; p. 211.

TABLE 5–25. AIRPLANE STRENGTHS OF ALLIED AND ENEMY AIR SERVICES
November 11, 1918

Air Service	TOTAL	Pursuit	Observation	Day Bombardment	Night Bombardment
ALLIED					
TOTAL	6,784	2,814	2,761	684	525
American	740	330	293	117	—
British	1,758	759	503	306	190
French	3,321	1,344	1,505	225	247
Italian	812	336	360	36	80
Belgian	153	45	100	—	8
ENEMY					
TOTAL	3,352	1,240	1,833	—	279
German	2,730	1,020	1,442	—	268
Austrian	622	220	391	—	11

Source: Col. Edgar S. Gorrell in Supplemental Military Appropriation Bill for 1940, Hearings, House of Representatives, May 18, 1939, p. 318.

CHAPTER VI

AIRLINES

The U.S. commercial airlines in scheduled domestic and international service operate about 1,250 planes, half of them four-engined, and fly over 190,000 route miles. These airlines offer more lift capacity than the rest of the world's air carriers combined.

Today, these U.S. airlines are recognized leaders in the world. Their airplanes are considered the safest and most reliable equipment available. They fly more than half (excluding the U.S.S.R. and China) of the world's passenger-miles, cargo ton-miles and mail ton-miles.

Already, the domestic airlines carry more passenger-miles of revenue traffic than Pullman cars and if present trends continue they will, within a few years, carry more than railroad coaches.

Speed and Cost

Wagon transport on the Philadelphia-Lancaster Turnpike (which was finished in 1794) moved at a snail's pace and at a cost of 13.5 cents per ton-mile. Today, with a much cheaper dollar, railroad freight moves for about one and one-half cents per ton-mile and travels a few hundred miles per day, while air freight crosses the continent in less than a day's time for about 20 cents per ton-mile.

A passenger who took the stagecoach from Pittsburgh to Philadelphia in 1812 had to spend six days on the road and paid 27 dollars for the trip. In 1834 he could cover the distance by rail, canal and stage coach in less than four days for about $15. Today, when the dollar is worth much less, the fastest train will take him there in six hours for $11.81 by coach, or $18.25 by parlor car. If he takes a plane he can make the trip in one hour and a half for $16.75.

Private Enterprise and Public Aid

Private enterprise has given the impetus to most of our development in transportation. Beginning with the private corporations formed to build the first turnpikes, private citizens and business organizations have provided much of the inventive genius, the production technology, the managerial drive and the capital that have given direction and strength to the development of the newer forms of transportation.

From the earliest days, however, the government realized that fast

and economical transportation was necessary for the economic growth of the country and for its protection; consequently, public enterprise has supplied a substantial part of the basic facilities over which private equipment has operated.

In the long run, each mode of transportation pays back more than the public aid put into it. Today, the railroads operate without government subsidy and highway users contribute through their gasoline and license taxes to the cost of maintaining highways. Civil aviation, still in its early stages of development, is going through the same cycle.

The first major use of the airplane was to carry the mail and for this reason the Post Office Department has played a major role in civil aviation history. The first air mail was carried in 1911; but it was not until 1917 that funds were appropriated for an air mail experiment. New York-Washington service began the next year. For seven years Government planes carried the mail. By 1925 private operation appeared feasible and the Kelly Air Mail Act created an economic basis for a civil airlines industry. Private capital was quickly attracted. By 1926, a number of airlines were organized and the first private carriers were in operation.

Since that time the airlines have been helped by government subsidy and by government-furnished airways service. These aids, like the ones to older means of transportation, have been provided because it was in the public interest to develop and encourage "an air transportation system properly adapted to the present and future needs of the foreign and domestic commerce of the United States, of the Postal Service, and of the National Defense." Every year the amount of the direct subsidy comprises a smaller percentage of the total operating revenue of the domestic and international airlines and the time appears not too far distant when the airlines will be self-supporting.

Government Regulatory Bodies

Under the Civil Aeronautics Act of 1938, air carriers must obtain a certificate of "convenience and necessity" prior to engaging in scheduled air transportation.

These certificates are granted by the Civil Aeronautics Board, after investigating all applications and holding open hearings. The CAB regulates the economic aspects of United States airlines, promulgates safety standards, investigates accidents, and cooperates and assists in the development of international air tranportation.

The Civil Aeronautics Administration enforces civil air regulations; plans, constructs and maintains the Federal Airways System; coordinates a national system of airports; and aids aviation education and training.

Airlines and the National Defense

America's air transport fleet is a major component of the nation's air power. About 300 four-engined airliners have been earmarked under a program establishing an air transportation reserve for transfer to overseas U.S. military operations on 48 hours' notice in case of an emergency. Such a transfer would give the military more than four times the ton-mileage capacity it received from the airlines at the outbreak of World War II, yet would not seriously disrupt normal civilian traffic.

TABLE 6-1. NET ASSETS OF AIRLINES, 1946—1953
(Millions of Dollars)

As of June 30	TOTAL	Aircraft	Buildings and Ground Equipment	Working Capital and Other
DOMESTIC TRUNK LINES[a]				
1946	$268.0	$ 80.3	$ 45.9	$141.8
1947	332.7	143.4	62.8	126.5
1948	341.0	179.7	74.3	87.0
1949	354.4	176.5	64.5	113.4
1950	368.5	186.4	59.9	122.2
1951	413.9	213.5	59.3	141.1
1952	462.2	280.9	55.2	126.1
1953	550.9	349.7	60.2	141.0
LOCAL SERVICE				
1946	$ 1.9	$ .3	$ .2	$ 1.4
1947	6.6	3.0	.7	2.9
1948	8.8	3.5	1.2	4.1
1949	9.7	4.3	1.6	3.8
1950	10.2	4.5	1.7	4.0
1951	11.4	5.8	1.9	3.7
1952	15.0	9.9	2.0	3.1
1953	17.5	13.4	2.5	1.6
INTERNATIONAL[b]				
1946	$ 88.8	$ 25.2	$ 10.1	$ 53.5
1947	122.3	47.5	12.9	61.9
1948	127.2	49.2	12.8	65.2
1949	125.3	68.0	13.0	44.3
1950	130.5	66.5	11.8	52.2
1951	138.8	70.4	12.9	55.5
1952	126.1	79.1	10.3	36.7
1953	160.2	84.5	10.2	65.5
LARGE IRREGULARS				
Dec. 31, 1949	$ 3.7	$ 3.6	$ .1	
Dec. 31, 1950	4.5	5.0	(.5)	
Sept. 30, 1951	6.2	4.3	1.9	
Jun. 30, 1952	10.0	8.8	1.5	(.3)
Jun. 30, 1953	13.7	11.5	1.1	1.1

Figures in parentheses indicate liabilities.

[a] Includes international and overseas operations of joint-service carriers.

[b] Excludes carriers operating joint domestic and international or overseas services.

Source: Civil Aeronautics Board, "Annual Report of the Civil Aeronautics Board, 1952," p. 48; brought up to date from CAB files.

TABLE 6-2. SUMMARY OF U. S. AIR TRAFFIC TRENDS, 1948—1953

Year Ending June 30	TOTAL[a]	Domestic Trunk Lines	Local Service Carriers	International Carriers	Territorial and Alaska Carriers	Large Irregular and Certificated Non-Mail Carriers	Certificated All-Cargo Carriers
Revenue Passenger-Miles (Millions)							
1948	7,913	5,931	64	1,868	N.A.	N.A.	....
1949	8,500	6,257	112	2,018	113	N.A.	....
1950	9,870	6,926	157	2,073	88	626	....
1951	12,693	9,071	240	2,391	115	876	....
1952	15,531	11,034	310	2,826	108	1,253	....
1953	18,472	13,398	371	3,261	115	1,327	....
Cargo Ton-Miles (Millions)							
1948	137	89	[b]	46	N.A.	N.A.	N.A.
1949	191	117	1	64	9	N.A.	N.A.
1950	266	140	1	65	4	20	35
1951	389	165	2	75	4	70	74
1952	408	151	2	88	2	79	86
1953	450	182	2	89	3	77	97
Mail Ton-Miles (Millions)							
1948	50	36	[b]	14	N.A.	....	....
1949	61	41	[b]	19	[b]	....	....
1950	63	42	1	20	1	....	....
1951	77	54	1	22	1	....	....
1952	92	68	1	22	1	....	....
1953	95	69	1	23	2	....	....

N.A.—Not available.

[a] "Total" may exceed the listed components because subtotals for "Not Available" items may be included.

[b] Less than one-half million.

Source: Civil Aeronautics Board, "Annual Report of the Civil Aeronautics Board, 1952," p. 42; brought up to date from CAB files.

TABLE 6-3. DOMESTIC SCHEDULED AIRLINES—OPERATORS, EQUIPMENT, AND SPEED 1926—1952

As of December 31	Operators	Aircraft in Service	Average Available Seats	Route Mileage Operated	Average Speed, M.P.H.
1926	13	N.A.	N.A.	N.A.	N.A.
1927	18	N.A.	N.A.	N.A.	N.A.
1928	34	268	N.A.	N.A.	N.A.
1929	38	442	N.A.	N.A.	N.A.
1930	43	497	N.A.	30,293	N.A.
1931	39	490	N.A.	30,857	N.A.
1932	32	456	6.61	28,956	N.A.
1933	25	418	7.59	28,283	N.A.
1934	24	423	8.86	28,609	N.A.
1935	26	363	10.33	29,190	N.A.
1936	24	280	10.67	29,797	N.A.
1937	22	291	12.52	32,006	N.A.
1938[a]	16	260	13.91	34,879	N.A.
1939[b]	18	276	14.66	36,654	N.A.
1940	19	369	16.54	42,757	N.A.
1941	19	370	17.54	45,163	N.A.
1942	19	186	17.91	41,596	N.A.
1943	19	204	18.34	42,537	N.A.
1944	19	288	19.05	47,384	155.6
1945	20	421	19.68	48,516	155.4
1946	24	674	25.25	53,981	160.2
1947	28	810	29.93	62,215	168.2
1948	31	878	32.37	68,702	171.9
1949	37	913	35.03	72,667	179.0
1950	38	960	37.47	77,440	181.2
1951	38	981	39.55	79,057	184.6
1952	35	1,078	42.71	77,977	190.8

N.A.—Not available.

[a] Does not include Colonial and Marine Airlines.

[b] Does not include Marine Airlines.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 51, 52. Brought up to date from CAA files.

TABLE 6-4. U. S. INTERNATIONAL SCHEDULED AIRLINES—OPERATORS, EQUIPMENT, SPEED, 1928—1952

As of December 31	Operators	Aircraft in Service	Average Available Seats	Route Miles Operated (thousands)	Average Speed M.P.H.
1928	1	57	N.A.	N.A.	N.A.
1929	4	83	N.A.	N.A.	N.A.
1930	3	103	N.A.	19.2	N.A.
1931	3	100	N.A.	19.5	N.A.
1932	3	108	N.A.	19.6	N.A.
1933	3	86	N.A.	19.4	N.A.
1934	2	99	N.A.	22.2	N.A.
1935	2	101	N.A.	31.3	N.A.
1936	2	94	N.A.	32.0	N.A.
1937	2	92	N.A.	32.0	N.A.
1938	2	73	16.9	35.0	N.A.
1939	2	84	17.7	43.5	N.A.
1940	3	68	18.3	52.3	N.A.
1941	3	83	18.0	N.A.	N.A.
1942	3	68	17.7	N.A.	N.A.
1943	3	70	17.5	27.2	N.A.
1944	3	70	18.5	29.7	149.2
1945	4	97	18.9	38.9	150.7
1946	9	147	27.2	66.4	166.3
1947	12	154	35.2	95.5	191.1
1948	13	175	35.1	105.9	198.5
1949	13	177	36.6	109.0	207.1
1950	12	160	41.0	106.4	218.4
1951	12	140	46.4	108.8	223.5
1952	13	148	49.1	110.5	226.8

N.A.—Not available.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 72, 74; brought up to date from CAA files.

TABLE 6-5. DOMESTIC SCHEDULED AIRLINES—AIRCRAFT IN SERVICE BY MAKE AND MODEL, 1941—1952

Aircraft Make & Model	As of December 31							
	1941	1943	1945	1947	1949	1950	1951	1952
Beech								
C17B	..	2	..	..	..	..	..	..
D18C	..	..	..	6	..	..	..	..
A35	..	..	..	..	11	10	..	..
Bell								
B47D	..	..	..	..	6	6	6	6
Boeing								
247D	27	..	..	4	..	..	..	..
307	5	..	5	5	5	5	..	..
377	..	..	..	..	10	10	16	16
Cessna								
190	..	..	..	..	7	8	6	..
T50	..	..	..	..	3	6	5	5
Curtiss								
C46	..	..	..	..	..	2	..	..
Convair								
240	..	..	..	..	93	103	102	99
340	..	..	..	..	..	..	..	25
Douglas								
DC-3, 3S[a]	280	177	383	459	413	410	425	381
DC-4	..	..	..	186	160	146	137	124
DC-6, 6B	..	..	..	83	104	113	139	161
Lockheed								
10	16	..	3	..	6	6	..	..
18	13	13	18	12	11	11	11	11
L49	..	..	..	22	23	34	34	37
649	..	..	..	14	13	3	6	5
749	..	..	..	..	19	49	56	59
1049	..	..	..	..	..	..	5	24
Martin								
2-0-2	..	..	..	9	24	33	12	21
4-0-4	..	..	..	..	..	..	18	96
Sikorsky								
S43	..	3	1	..	..	..	..	..
S51	..	..	..	3	5	5	3	3
S55	..	..	..	..	..	..	..	5
Stinson								
SR	..	9	10	7	..	..	..	..
W	..	..	1	..	..	..	..	..
TOTAL	341	204	421	810	913	960	981	1078
Single Engine	..	11	11	10	35	29	15	9
Twin Engine	336	193	405	698	544	571	573	643
Four Engine	5	..	5	102	334	360	393	426

[a] Also includes some DC-2's in early years.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 52. Brought up to date from CAA files.

Aircraft Industries Association, "Aviation Facts and Figures, 1945," p. 67.

TABLE 6-6. U. S. INTERNATIONAL SCHEDULED AIRLINES AIRCRAFT IN SERVICE BY MAKE AND MODEL, 1943—1952

Aircraft, Make and Model	As of December 31						
	1943	1945	1947	1949	1950	1951	1952
Boeing							
307	3	3	..	..	..	..	..
314	8	7	..	..	..	..	..
377	..	..	..	31	35	29	28
Convair							
240	..	..	..	20	16	14	14
Douglas							
DC-2	3	2	..	..	..	..	..
DC-3	45	68	47	23	19	19	21
DC-4	..	13	78	72	64	54	46
DC-6	..	..	3	6	6	6	25
Lockheed							
10	2	..	..	..	..	..	..
18	3	..	..	..	..	..	..
L49	..	..	22	21	20	18	14
649	..	..	4	..	..	..	..
749	..	..	..	4	..	..	..
Martin							
130	1	..	..	..	..	..	..
Sikorsky							
S42B	4	3	..	..	..	..	..
S43	1	1	..	..	..	..	..
TOTAL	70	97	154	177	160	140	148
Twin Engine	54	71	47	43	35	33	35
Four Engine	16	26	107	134	125	107	113

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 73; brought up to date from CAA files.

TABLE 6-7. DOMESTIC SCHEDULED AIRLINES—PASSENGER SERVICE, 1926—1952

Year	Passengers Carried[a] (Thousands)	Passenger Seat-Miles Flown (Millions)	Revenue Passenger-Miles Flown[b] (Millions)	Revenue Passenger Load Factor (Percent)	Average Passenger Revenue per Passenger-Mile (Cents)	Percentage of Scheduled Trips Completed[c]	Average Length of Trip (Miles)
1926	5.8	N.A.	1.0	N.A.	N.A.	N.A.	N.A.
1927	8.7	N.A.	3.0	N.A.	N.A.	N.A.	N.A.
1928	48.3	N.A.	13.0	N.A.	11.0	N.A.	N.A.
1929	161.9	N.A.	41.0	N.A.	12.0	88.1	N.A.
1930	384.5	N.A.	85.1	N.A.	8.3	89.1	221
1931	472.4	N.A.	107.0	N.A.	6.7	86.4	226
1932	476.0	303.6	127.4	N.A.	6.1	83.9	268
1933	502.2	373.8	174.8	N.A.	6.1	85.3	348
1934	475.5	367.8	189.9	N.A.	5.9	86.6	399
1935	678.5	577.7	316.3	N.A.	5.7	87.7	415
1936	931.7	686.2	439.0	N.A.	5.7	90.1	421
1937	985.1	836.2	411.5	49.22	5.6	89.5	418
1938	1,197.1	951.5	479.8	50.43	5.2	90.5	401
1939	1,734.8	1,215.2	682.9	56.20	5.1	92.6	394
1940	2,802.8	1,817.1	1,052.2	57.90	5.1	91.1	375
1941	3,848.9	2,341.9	1,384.7	59.13	5.0	91.2	360
1942	3,136.8	1,963.6	1,418.0	72.22	5.3	94.3	452
1943	3,019.7	1,857.0	1,634.1	88.00	5.3	95.6	541
1944	4,046.0	2,436.8	2,178.2	89.39	5.4	94.1	538
1945	6,476.3	3,815.6	3,362.5	88.12	5.0	94.2	511
1946	12,213.4	7,556.5	5,948.0	78.71	4.6	95.8	487
1947	12,890.2	9,373.8	6,109.5	65.12	5.1	94.8	474
1948	13,168.1	10,385.1	5,981.0	57.59	5.8	96.3	454
1949	15,080.7	11,672.9	6,752.6	57.85	5.8	97.2	448
1950	17,343.7	13,064.5	8,002.8	61.28	5.6	97.0	461
1951	22,652.2	15,565.7	10,566.2	67.88	5.6	96.4	466
1952	25,019.7	19,097.1	12,528.3	67.88	5.6	[d]	502

N.A.—Not available.

[a] 1926-1934: Duplicated revenue and nonrevenue passengers. 1935-1941: Duplicated revenue passengers. 1942 to date: Unduplicated revenue passengers.

[b] 1926-1936: Includes nonrevenue passenger-miles.

[c] From 1942, percentage of scheduled miles completed.

[d] No longer computed by Civil Aeronautics Board.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 57, 58, 60, 61. Brought up to date from CAA files.

TABLE 6-8. U. S. INTERNATIONAL SCHEDULED AIRLINES—PASSENGER SERVICE, 1929—1952

Year	Passengers Carried[a] (Thousands)	Passenger Seat-Miles Flown (Millions)	Revenue Passenger-Miles Flown[b] (Millions)	Revenue Passenger Load Factor (Percent)	Average Passenger Revenue per Passenger Mile (Cents)	Percentage of Scheduled Miles Completed	Average Length of Trip (Miles)
1929	11.5	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1930	33.0	N.A.	18.6	N.A.	N.A.	N.A.	464
1931	59.2	N.A.	14.2	N.A.	N.A.	N.A.	238
1932	71.5	N.A.	20.8	N.A.	N.A.	N.A.	289
1933	74.4	N.A.	25.0	N.A.	N.A.	N.A.	315
1934	96.8	N.A.	36.8	N.A.	N.A.	N.A.	351
1935	111.3	N.A.	46.0	N.A.	N.A.	N.A.	381
1936	87.7	N.A.	41.8	N.A.	N.A.	N.A.	414
1937	112.3	N.A.	53.7	N.A.	N.A.	N.A.	416
1938	N.A.	116.1	53.2	45.83	8.33	N.A.	487
1939	136.1	134.4	71.8	53.46	8.57	N.A.	557
1940	170.2	175.5	99.8	56.88	8.83	N.A.	614
1941	235.8	248.3	162.8	65.57	8.61	N.A.	713
1942	276.2	313.1	237.0	75.68	8.85	N.A.	880
1943	292.9	307.5	244.2	79.42	7.92	98.54	874
1944	356.7	391.3	310.6	79.37	7.82	96.72	910
1945	493.5	583.4	448.0	76.78	8.67	95.96	942
1946	1,066.4	1,553.7	1,100.7	70.85	8.31	96.04	1,057
1947	1,359.7	2,924.3	1,810.0	61.90	7.77	95.79	1,332
1948	1,372.9	3,292.3	1,889.0	57.38	8.01	97.39	1,376
1949	1,520.1	3,624.7	2,054.0	56.67	7.72	97.44	1,351
1950	1,675.5	3,695.4	2,206.4	59.71	7.28	97.57	1,316
1951	2,041.8	4,327.7	2,599.8	60.08	7.10	98.11	1,273
1952	2,365.5	4,850.9	3,019.8	62.28	7.04	[c]	1,277

N.A. Not available.

[a] 1929-1946: Total passengers; 1947 to date: Revenue passengers only.

[b] 1930-1937: Total passenger-miles; 1938 to date: Revenue passenger-miles.

[c] No longer computed by Civil Aeronautics Board.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 72, 74, 76, 78, 80; brought up to date from CAA files.

TABLE 6-9. ALL DOMESTIC CARRIERS—MAIL AND AIR CARGO CARRIED, 1934—1952

(Millions of Ton-Miles)

Year	Total Mail	Total Cargo[a] (Excluding Mail)	Airlines, Scheduled[a] and Non-Scheduled		All-Cargo Carriers[a]	Large Irregular Carriers
			Express	Freight		
1934	2.2	...	N.A.		...	...
1935	4.1	1.1	1.1		...	...
1936	5.7	1.9	1.9		...	...
1937	6.7	2.2	2.2		...	...
1938	7.4	2.2	2.2		...	...
1939	8.6	2.7	2.7		...	...
1940	10.1	3.5	3.5		...	...
1941	13.1	5.3	5.3		...	...
1942	21.2	11.9	11.9		...	...
1943	36.1	15.1	15.1		...	...
1944	51.1	17.0	17.0		...	...
1945	65.1	22.2	22.2		...	...
1946	33.0	82.6[b]	23.8	14.8	19.5	20.6
1947	33.1	128.0[b]	28.8	35.9	28.9	31.1
1948	37.9	150.8[b]	30.1	71.3	38.6	11.2
1949	40.0	172.3	27.3	94.2	37.6	13.2
1950	46.3	244.1	36.5	112.9	58.4	36.3
1951	62.9	293.6	40.3	100.6	72.3	80.4
1952	68.3	321.9	40.4	117.1	85.5	78.9

N.A.—Not available.

[a] Includes non-scheduled operations of scheduled carriers.

[b] Due to use of different sources, total does not equal sum of listed components.

Sources: 1934–1948: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 61; "Domestic Air Cargo Forecast, 1955 and 1960," p. 8.

1949: Civil Aeronautics Board, "Statistical Reports of Air Carriers," Twelve Month Reports as of December 31.

Civil Aeronautics Administration, "Domestic Air Cargo Forecast, 1955 and 1960," p. 8.

1950–1952: Civil Aeronautics Board, "Statistical Reports of Air Carriers," Twelve Month Reports as of December 31 of each year; Bureau of Air Operations.

TABLE 6-10. TRANS-ATLANTIC PASSENGER TRAVEL BY AIR AND SEA, 1946—1953

Year Ending June 30	By Air (Regular Scheduled)			By Sea, Passengers
	Total Passengers	U. S. Carriers	Other	
Westbound				
1946	46,475	43,953	2,522	112,943
1947	85,838	63,266	22,572	239,163
1948	126,138	89,780	36,358	314,714
1949	148,986	106,457	42,529	330,782
1950	161,091	106,908	54,183	427,113
1951	180,465	107,195	73,270	401,243
1952	194,914	114,659	80,255	458,427
1953	251,303	142,153	109,150	397,018
Eastbound[a]				
1950	135,804	88,020	47,784	296,996
1951	137,733	82,990	54,743	262,378
1952	177,432	100,768	76,664	308,654
1953	245,718	143,928	101,790	354,494

[a] Figures for eastbound passengers not available until 1950.

Source: U. S. Department of Justice, Immigration and Naturalization Service, Administrative Division, Statistics Branch, letter of May 21, 1953.

TABLE 6-11. U. S. INTERNATIONAL SCHEDULED AIRLINES, MAIL AND AIR CARGO CARRIED, 1943—1952
(Millions of Ton-Miles)

Year	Total Mail	Express	Freight
1943	2.0	5.1	
1944	2.0	6.2	
1945	3.4	8.7	
1946	6.1	15.1	
1947	12.8	30.8	2.1
1948	17.2	41.6	4.0
1949	19.8	49.4	6.7
1950	21.2	44.5	16.1
1951	22.0	24.5	46.8
1952	22.0	72.7	

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 76; brought up to date from CAA files.

TABLE 6-12. U. S. DOMESTIC SCHEDULED AIRLINES—PERSONNEL, 1928—1952

Year	TOTAL	Pilots and Co-pilots	Other Flight Personnel	Pursers, Stewards, Stewardesses	Meteorologists, and Dispatchers	Mechanics	Other Hangar & Field Personnel	Office Employees	All Others
1928[a]	1,496	308	N.A.	N.A.	N.A.	525	663	N.A.	N.A.
1929	1,958	514	N.A.	N.A.	N.A.	958	486	N.A.	N.A.
1930	2,778	616	N.A.	N.A.	N.A.	1,416	746	N.A.	N.A.
1931	4,314	622	N.A.	N.A.	N.A.	1,671	1,006	1,015	N.A.
1932	4,020	640	N.A.	N.A.	N.A.	1,641	939	800	N.A.
1933	4,369	680	N.A.	N.A.	N.A.	1,810	1,089	790	N.A.
1934	4,201	667	N.A.	N.A.	N.A.	1,650	923	961	N.A.
1935	5,945	874	N.A.	213	N.A.	2,016	470	2,372	N.A.
1936	7,079	1,055	N.A.	333	N.A.	2,164	546	2,981	N.A.
1937	7,586	1,064	N.A.	339	N.A.	2,228	658	3,297	N.A.
1938[b]	9,008	1,135	N.A.	358	186	2,430	712	3,715	472
1939[c]	10,639	1,412	N.A.	536	181	2,822	877	4,583	228
1940	15,984	1,939	18	914	193	4,054	1,880	5,855	1,131
1941	19,223	2,217	19	1,028	220	4,423	2,224	7,807	1,285
1942	26,910	2,194	112	753	1,581	9,348	2,969	7,717	2,236
1943	29,654	2,125	8	845	1,685	8,271	3,356	10,973	2,391
1944	31,198	2,879	11	1,322	1,870	7,136	3,509	12,201	2,270
1945	50,313	4,967	108	2,075	2,613	10,844	7,012	19,241	3,453
1946	69,182	5,712	98	3,342	3,577	16,107	10,307	24,626	5,413
1947	58,998	5,034	181	3,061	2,618	15,366	8,409	22,012	2,317
1948	60,416	5,307	312	3,038	2,612	16,428	9,222	21,396	2,101
1949	59,886	5,257	642	3,199	2,497	15,674	9,336	21,136	2,145
1950	61,903	5,785	776	3,372	2,450	15,788	9,822	21,894	2,016
1951	72,898	6,688	1,012	4,106	2,617	18,908	11,475	25,770	2,322
1952	82,116	7,424	1,242	4,594	3,085	20,476	[d]	[d]	45,295

N.A.—Not available.

[a] Employees of Pan American Airways included.

[b] Does not include Colonial and Marine Airlines.

[c] Does not include Marine Airlines.

[d] Included with "All Others."

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 53. Brought up to date from CAA files.

TABLE 6-13. U. S. INTERNATIONAL SCHEDULED AIRLINES—PERSONNEL, 1929—1952

Year Ending Dec. 31	TOTAL	Pilots and Co-pilots	Other Flight Personnel	Pursers, Stewards, Stewardesses	Meteorologists, and Dispatchers	Mechanics	Other Hangar & Field Personnel	Office Employees	All Others
1929	387	48	N.A.	N.A.	N.A.	224	115	N.A.	N.A.
1930	697	81	N.A.	N.A.	N.A.	405	211	N.A.	N.A.
1931	1,353	72	N.A.	N.A.	N.A.	390	549	342	N.A.
1932	1,590	77	N.A.	N.A.	N.A.	435	576	502	N.A.
1933	1,928	77	N.A.	N.A.	N.A.	517	750	584	N.A.
1934	2,276	92	N.A.	N.A.	N.A.	558	928	698	N.A.
1935	2,407	121	N.A.	N.A.	N.A.	602	1,048	636	N.A.
1936	2,916	186	N.A.	57	N.A.	710	1,221	742	N.A.
1937	4,000	291	N.A.	81	N.A.	1,050	1,698	880	N.A.
1938	4,266	278	N.A.	93	N.A.	977	1,923	995	N.A.
1939	5,275	287	7	103	N.A.	1,181	2,138	1,559	N.A.
1940	6,067	340	15	122	N.A.	1,359	2,397	1,834	N.A.
1941	7,235	447	30	182	N.A.	1,966	2,707	1,903	N.A.
1942	12,803	952	129	378	29	3,534	4,415	3,366	N.A.
1943	9,625	207	322	147	511	2,140	1,835	1,859	2,604
1944	11,409	466	266	194	631	2,827	2,239	3,033	1,753
1945	17,968	930	938	411	864	5,099	2,435	4,663	2,628
1946	27,372	1,508	1,405	1,079	1,454	7,269	2,463	6,961	5,233
1947	26,154	1,603	1,152	1,016	1,211	5,774	3,201	10,679	1,518
1948	24,192	1,619	1,203	1,104	1,049	5,400	2,440	9,749	1,628
1949	21,108	1,586	960	1,142	1,084	3,861	2,338	9,012	1,125
1950	20,883	1,492	745	1,055	953	3,818	2,434	9,244	1,142
1951	22,855	1,698	696	1,197	1,001	4,569	2,895	9,311	1,488
1952	22,377	1,561	711	1,219	1,001	4,544	[a]	[a]	13,341

N.A.—Not available.

[a] Included with "All Others."

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 74; brought up to date from CAA files.

TABLE 6-14. SCHEDULED AIRLINES—AVERAGE SALARIES, 1952

Job	Domestic	U. S. International
Pilots and copilots	$9,822	$10,772
Other flight personnel	6,247	8,001
Stewards, stewardesses, pursers	3,045	3,574
Dispatchers, communications operators, meteorologists	4,383	3,765
Mechanics	4,690	3,811
All others	4,037	2,883

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 54; brought up to date from CAA files.

TABLE 6-15. DOMESTIC SCHEDULED AIRLINES—OPERATING REVENUE AND EXPENSES 1938—1952

(Dollar Figures in Millions)

Year	Operating Revenue	Operating Expenses	Net Operating Income or Loss	Mail as Percent of Total Operating Revenue
1938	$ 42.9	N.A.	N.A.	37.0
1939	55.9	N.A.	N.A.	33.0
1940	76.9	$ 70.9	$ 6.0	26.1
1941	97.3	89.9	7.4	23.3
1942	108.2	84.4	23.9	21.7
1943	123.1	95.6	27.5	19.7
1944	160.9	124.5	36.4	20.7
1945	214.7	180.6	34.1	15.7
1946	316.2	322.2	(6.0)	6.6
1947	364.8	386.2	(21.4)	8.1
1948	434.3	431.6	2.7	13.7
1949	486.0	461.7	24.3	21.2
1950	557.8	494.6	63.2	11.4
1951	702.4	595.4	107.0	8.2
1952	817.8	723.4	94.4	7.2

Figures in parentheses indicate loss.

N.A.—Not available.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 63, 64; brought up to date from CAA files.

TABLE 6-16. U. S. INTERNATIONAL SCHEDULED AIRLINES OPERATING REVENUES AND EXPENSES, 1938—1952
(Dollar Figures in Millions)

Year	Operating Revenue	Operating Expenses	Net Operating Income or Loss	U. S. Mail as Percent of Total Operating Revenue
1938	$ 15.2	$ 14.3	$ .9	56.8
1939	19.7	18.2	1.5	56.3
1940	26.9	25.7	1.3	49.9
1941	38.0	35.3	2.7	40.7
1942	40.9	35.2	5.6	22.1
1943	32.8	32.1	.8	11.0
1944	38.9	39.2	(.3)	7.4
1945	69.1	61.8	7.3	17.7
1946	146.8	139.8	6.9	17.1
1947	209.0	209.3	(.3)	15.4
1948	249.2	235.3	13.9	23.0
1949	274.2	252.9	21.3	27.4
1950	260.1	248.3	11.8	21.4
1951	287.9	269.9	18.0	18.5
1952	315.1	304.4	10.7	16.4

Figures in parentheses indicate loss.
Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 82, 83; brought up to date from CAA files.

TABLE 6-17. PASSENGER RATES, 1953[a]
Yield per Passenger-mile

Type of Airline Travel	Cents
Domestic Trunk Line	
All classes	5.50
Coach	4.14
Family Plan	4.38
All other	6.06
Local Service	5.61
International	6.95
Territorial (excluding Alaska)	6.92
Large Irregulars[b]	3.20

[a] Fiscal Year ending June 30, 1953.
[b] Excludes all charter operations. Based on operations of 24 airlines for quarter ending March 31, 1953 and 23 airlines for quarter ending June 30, 1953.
Source: Civil Aeronautics Board; unpublished data.

TABLE 6-18. FREIGHT RATES, 1948—1953
(Average Yield per Ton-Mile for All Commodities)

Year Ending June 30	Domestic Trunk Lines (Cents)	All-Cargo Lines (Cents)	Local Service (Cents)	International[a] (Cents)	Territorial[b] (Cents)
1948	20.7	...	27.8	48.9	51.0
1949	19.6	...	29.8	42.5	54.2
1950	19.4	15.9	31.2	36.4	55.7
1951	19.7	14.9	31.1	36.1	48.4
1952	21.1	15.4[c]	34.7	35.6	44.9
1953	22.1	16.2[d]	38.5	33.2	47.7

[a] Includes express.
[b] Excludes intra-Alaskan carriers.
[c] Excludes one company.
[d] Includes preliminary data for one company.
Source: Civil Aeronautics Board, "Annual Report of the Civil Aeronautics Board, 1952," p. 13; brought up to date from CAB files.

TABLE 6-19. DOMESTIC AIRMAIL RATES, SINCE 1918

Effective Date	Rate	Note
1918, May 15	24¢ per ounce or fraction	10¢ of this for special delivery
July 15	16¢ for first ounce or fraction	10¢ of this for special delivery
Dec. 15	6¢ per ounce or fraction	
1919, July 18	2¢ per ounce	
1924, July 1	8¢ per ounce or fraction per zone	3 zones established
1925, July 1	10¢ per ounce or fraction	Overnight airmail New York-Chicago
1926, Jan. 19	10¢ per ounce for fraction up to 1,000 miles	More for greater distances
Sep. 4-11	Special rates for special services	Varying from 8 to 32¢
1927, Feb. 1	10¢ per half ounce or fraction	Zoning abandoned
1928, Aug. 1	5¢ for first ounce or fraction	
1932, July 6	8¢ for first ounce or fraction	
1934, July 1	6¢ per ounce or fraction	
1944, Mar. 26	8¢ per ounce or fraction	Overseas mail to servicemen 6¢ per half ounce
1946, Oct. 1	5¢ per ounce or fraction	
1949, Jan. 1	6¢ per ounce or fraction 4¢ per postal card or post card	

Source: Interstate Commerce Commission, "Some Aspects of Postwar Air and Surface Transportation," January, 1945, pp. 12-13.
Post Office Department, Bureau of Transportation, Division of Air Service.

TABLE 6-20. DOMESTIC AIRMAIL—POST OFFICE REVENUE AND EXPENDITURES 1919—1952

(Millions of Dollars)

Year Ending June 30	Postal Revenue from Airmail	Paid to Airlines and Field Airmail Salaries	Total Calculated Cost of Airmail	Surplus or Deficit
1918–28	$ 22.2	$ 17.7	$ 22.9	$ (.8)
1929	4.3	11.2	12.7	(8.4)
1930	5.3	14.7	15.2	(9.9)
1931	6.2	17.0	17.6	(11.4)
1932	6.0	20.0	23.8	(17.8)
1933	6.1	19.5	23.0	(16.9)
1934	5.7	12.5	15.3	(9.6)
1935	6.6	9.1	12.6	(6.0)
1936	9.7	12.0	16.9	(7.2)
1937	12.4	13.0	19.2	(6.8)
1938	15.3	14.7	22.1	(6.8)
1939	16.3	17.0	24.9	(8.6)
1940	19.1	19.4	28.4	(9.3)
1941	23.9	20.7	31.3	(7.4)
1942	33.4	23.5	37.2	(3.8)
1943	62.8	22.3	44.5	18.3
1944	79.4	28.4	49.4	30.0
1945	81.2	35.5	49.8	31.4
1946	68.4	28.9	49.8	18.6
1947	54.4	33.8	69.0	(14.6)
1948	53.6	50.0	82.3	(28.7)
1949	65.4	66.5	103.7	(38.3)
1950	74.1	68.6	108.9	(34.8)
1951	95.4	72.6	116.5	(21.1)
1952	120.7	67.8	153.1	(32.6)
Total Deficit				$ (202.5)

Figures in parentheses indicate deficit.

Sources: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 70.
U. S. Post Office Department, "Cost Ascertainment Report, 1951," pp. 90, 108, 118, 119; brought up to date by Post Office Department, Cost Ascertainment Division.

TABLE 6-21. FOREIGN AIRMAIL—POST OFFICE REVENUE AND EXPENDITURES 1921—1952
(Millions of Dollars)

Year Ending June 30	Postal Revenue from Airmail	Paid to Airlines	Total Calculated Cost of Airmail	Surplus or Deficit
1921-29	$ 1.1	$ 1.6	$ 1.6	$ (.5)
1930	.3	4.3	4.3	(4.0)
1931	.8	6.6	6.6	(5.8)
1932	1.1	7.0	7.2	(6.1)
1933	.9	6.9	7.2	(6.2)
1934	1.3	6.9	7.2	(5.9)
1935	1.6	6.8	7.1	(5.5)
1936	2.0	6.6	7.0	(5.0)
1937	2.1	6.7	7.1	(5.0)
1938	3.8	8.6	9.1	(5.3)
1939	3.9	9.3	9.9	(6.0)
1940	5.9	12.4	13.2	(7.3)
1941	9.3	15.6	16.3	(7.0)
1942	12.0	14.4	15.0	(3.0)
1943[a]	28.5	5.6	24.1	4.4
1944[a]	51.3	3.0	30.0	21.3
1945[a]	110.7	6.1	59.2	51.5
1946[a]	58.1	13.0	54.7	3.4
1947	21.8	31.4	35.4	(13.6)
1948	23.8	46.2	56.1	(32.3)
1949	25.7	58.2	67.8	(42.1)
1950	27.3	61.0[b]	72.6	(45.3)
1951	31.3	65.0[b]	67.4	(36.2)
1952	32.1	57.6[b]	53.3	(21.2)
Total Deficit				$ (182.7)

Figures in parentheses indicate deficit.

[a] Overseas transportation, except to South America, was handled by Air Transport Command.

[b] Excludes salaries of field personnel.

Sources: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 81.
U. S. Post Office Department, "Cost Ascertainment Report, 1951," pp. 90, 108, 118, 119; brought up to date by the Post Office Department, Cost Ascertainment Division.

TABLE 6-22. DOMESTIC CERTIFICATED ALL-CARGO CARRIERS, 1949—1952

Year	Airplanes in Service	Freight Ton-Miles[a] (Millions)	Load Factor (Percent)	Rates per Ton-Mile, (Cents)
1949	N.A.	10.5	70.8	17.2
1950	48	58.4	74.4	15.6
1951	67	80.9	77.6	15.2
1952	71	85.5[b]	82.0	15.3

N.A.—Not available.

[a] Scheduled operations only.

[b] Slick and Flying Tigers only.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 71; brought up to date from CAA files.

Civil Aeronautics Administration, Staff Study "Domestic Air Cargo Forecast, 1955 and 1960," p. 28; brought up to date from CAA files.

TABLE 6-23. LARGE IRREGULAR CARRIERS AND IRREGULAR TRANSPORT CARRIERS, 1949—1952

Year Ending Dec. 31	Operators	Aircraft in Service	Revenue Passenger-Miles (Millions)	Cargo Ton-Miles (Millions)	Personnel		
					Total	Flight	Ground
1949	72	281	581.7	25.0	N.A.	N.A.	N.A.
1950	69	284	769.8	36.3	2,539	1,137	1,402
1951	83	193	1,069.5	80.4	3,247	N.A.	N.A.
1952[a]	80	223	1,251.7	78.9	3,435	1,493	1,942

N.A. Not available.

[a] Preliminary.

Note: The figures shown in this table include all non-certificated carriers, passenger and transport, domestic and international. Several formerly irregular certificated carriers have been granted certificates and have therefore been dropped from this table; this table should therefore not be used to draw conclusions as to trends.

Source: Civil Aeronautics Board; unpublished data.

TABLE 6–24. DOMESTIC SCHEDULED AIRLINES: FATAL ACCIDENTS[a]
1927–1952

Year	Total Accidents	Total Fatalities	Passenger Fatalities	Million Plane-Miles per Fatal Accident	Million Plane-Miles per Fatality	Passenger Fatalities per 100 Million Passenger-Miles
1927	4	5	1	1.4	N.A.	N.A.
1928	11	23	14	.9	N.A.	N.A.
1929	21	36	14	1.1	N.A.	18.7
1930	9	33	24	3.6	1.0	28.6
1931	13	38	25	3.3	1.1	23.5
1932	16	36	19	2.9	1.3	15.0
1933	9	28	8	5.4	1.8	4.6
1934	8	29	17	5.1	1.4	9.1
1935	8	29	15	6.9	1.9	4.8
1936	8	61	44	8.0	1.1	10.1
1937	5	52	40	13.2	1.3	8.4
1938	5	35	25	13.7	2.0	4.5
1939	2	12	9	41.5	6.9	1.2
1940	3	45	35	36.6	2.4	3.0
1941	4	44	35	33.4	3.0	2.3
1942	5	71	55	21.9	1.5	3.7
1943	2	30	22	50.6	3.4	1.3
1944	3	56	48	42.6	2.3	2.2
1945	7	87	76	27.7	2.2	2.2
1946	9	97	75	33.3	3.1	1.2
1947	5	216	199	62.6	1.4	3.2
1948	5	98	83	64.2	3.3	1.3
1949	4	104	93	83.4	3.2	1.3
1950	4	109	96	87.3	3.2	1.1
1951	8	166	142	49.2	2.4	1.3
1952	6	54	46	89.4	8.6	.4

N.A.—Not available.

Note: 1927–1937 data are from Civil Aeronautics Administration records; 1938–1952 data are from Civil Aeronautics Board records.

[a] On passenger carrying services only, since 1938.

Sources: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation," 1945, p. 49; 1948, p. 93; 1950, p. 89.

Civil Aeronautics Board, Accident Analysis Division.

TABLE 6–25. INTERNATIONAL SCHEDULED AIRLINES: FATAL ACCIDENTS[a]
1938–1952

Year	Total Accidents	Total Fatalities	Passenger Fatalities	Million Plane-Miles per Fatal Accident	Million Plane-Miles per Fatality	Passenger Fatalities per 100 Million Passenger-Miles
1938	2	19	7	3.4	.4	13.0
1939	1	14	10	7.6	.5	12.8
1940	—	—	—	—	—	—
1941	1	2	2	13.8	6.9	1.2
1942	—	—	—	—	—	—
1943	1	14	10	17.6	1.3	3.9
1944	1	17	17	21.2	1.2	5.3
1945	2	27	17	15.4	1.1	3.7
1946	2	52	40	28.5	1.1	3.5
1947	3	33	20	27.7	2.5	1.1
1948	1	30	20	93.9	3.1	1.0
1949	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1950	2	56	48	45.3	1.6	2.1
1951	1	40	31	93.4	2.3	1.1
1952	4	139	127	33.0	.96	3.0

N.A.—Not available.

[a] On passenger-carrying services only.

Sources: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 94. Civil Aeronautics Board, Accident Analysis Division.

TABLE 6–26. NON-SCHEDULED AIRLINES: FATAL ACCIDENTS
1947–1952

Year	DOMESTIC[a]			INTERNATIONAL[a]		
	Fatal Accidents	Total Fatalities	Passenger Fatalities	Fatal Accidents	Total Fatalities	Passenger Fatalities
1947	8	52	38	1	1	—
1948	7	104	90	—	—	—
1949	10	117	99	1	8	7
1950	8	42	35	—	—	—
1951	7	93	78	—	—	—
1952	2	31	26	—	—	—

[a] Excludes Alaskan Operations.

Sources: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 99, 100.

Civil Aeronautics Board, Accident Analysis Division.

CHAPTER VII

UTILITY AIRPLANES AND HELICOPTERS

Utility Airplanes

For every airliner there are about 35 personally-owned or business-owned aircraft operating in the United States.

Civil Aeronautics Administration records indicate that the total active civil aircraft fleet today numbers about 54,000, of which the transport fleet of the airlines accounts for only about 1,500. (Though CAA registrations on January 1, 1953, listed about 90,000 U. S. civil aircraft, surveys indicate that some 33 percent of these are not in active use.)

Most of the 54,000 active civil planes are light utility aircraft operated for business, industrial and agricultural purposes and, to a lesser extent, for pleasure and sport. A substantial number, however, are larger multi-engined aircraft; in fact, more multi-engined transports are owned and operated for business purposes alone (principally for executive transportation) than are operated by the airlines.

Kinds of Utility Airplanes

There are four main types of utility airplanes:

(1) *One- to two-place, having a gross weight of 1,500 pounds or less.* Powered with 65 to 125 horsepower engines, these planes have speeds ranging from 70 to 125 miles per hour. In this group are found aircraft most often used for instruction, for agricultural purposes, and for sport flying.

(2) *Three- to four-place, weighing from 2,200 to 2,700 pounds.* Powered by engines of from 125 to 175 horsepower, the planes in this category are considered excellent cross-country aircraft, able to maintain cruising speeds of 110 to 140 miles per hour. Such aircraft are extensively used in all types of general aviation.

(3) *Four- to five-place, having a gross weight of from 2,200 to 4,600 pounds.* Powered by engines of from 175 to 300 horsepower, these planes can cruise at speeds of 140 to 200 miles per hour, and are generally called executive aircraft.

(4) *Five- to nine-place, twin-engined light transports.* Powered by 250 to 500 horsepower engines, these aircraft have a cross-country speed of from 150 to 200 miles per hour. They have four to seven hours' endurance on flights, and have instrumentation and radios enabling airline-type performance and blind flight in marginal weather.

In addition to these types, there are several hundred larger multi-engined aircraft in the civil fleet, comparable or identical to airline equipment. In most cases, these planes are used by corporations for executive transportation.

Utility Airplane Usage

Utility-type aircraft are used in six principal ways:

(1) *Business.* A large number of utility planes are used for rapid transportation in connection with the operation of business. Ownership and operation are by businessmen themselves, or by corporations which maintain their own air fleets.

(2) *Industrial.* Increasing numbers of utility airplanes are flown for industrial purposes, such as power and pipeline patrol, geophysical exploration, aerial mapping and survey, forestry survey and patrol, etc.

(3) *Agricultural.* The utility airplane is used for two purposes by farmers and ranchers. Individual farmers and ranchers fly for transportation and for such tasks as personal aerial surveys in connection with planting crops, erosion control, etc. Commercial operators also use utility aircraft for dusting, spraying and the application of other pesticides, fertilizers, hormones and chemicals.

(4) *Instructional.* The business of teaching persons to fly and of improving the skill of pilots is largely conducted by airport base operators as part of their airport business.

(5) *Charter.* Many airplanes are maintained by aviation services for charter or for rent (much as cars are chartered or rented, either with or without an operator). A growing "air taxi" industry also uses a large number of utility airplanes.

(6) *Pleasure or Sport.* Light planes also are flown for pleasure and for sport. Once the largest single use for light airplanes, pleasure and sport flying is now the smallest.

Production Levels

Monthly utility airplane production figures through August, 1953, show a steady increase during the current year over production in the comparable period of 1952. Based on the first eight months of production in 1953, total utility airplane output for 1953 should reach approximately 4,000—a thousand more units than were built the preceding year, and about double 1951's production. Statistics on airplane use in 1952 point to a continued increase in business and agricultural flying.

HELICOPTERS

In the seven years since the first certificated U. S. helicopter was flown, the nation's manufacturers have produced approximately 3,000

helicopters. Although the industry's production since the outbreak of hostilities in Korea has been concentrated primarily on military types, with a resultant restriction on industry-wide information, it is generally understood that helicopter manufacturers have maintained backlogs of unfilled orders on the order of $500 million over the past several years.

Manufacturing Picture

Although at present only a small segment of the U. S. aircraft industry, six helicopter manufacturers are presently in active production on 15 models. Current helicopter industry employment is about 14,000, and the annual helicopter industry payroll is approximately $52 million.

Manufacturers report a wide variety of models in various stages of design, development or actual flight testing. These range in size from one- to 60-place craft. The first of the so-called "flying cranes"—or heavy weight-lifting helicopters—is in an experimental stage.

Powerplants of the newer helicopter models include piston, gas generator, turboprop, and tip-jet units. Cruising speeds are expected to range from 75 to 170 miles per hour.

Military Use

The Korean War firmly established the utility of helicopters for aeromedical evacuation. By the end of the war, the Army alone had airlifted from the battlefield over 16,000 casualties. Helicopters also proved themselves in combat by moving combat troops and hundreds of tons of supplies over difficult terrain in incredibly short periods of time—and often were able to transfer personnel and material to commanding mountain heights inaccessible by other means of transportation. Because of its peculiar adaptability, the military services are placing increasing emphasis on helicopter development.

Civil Use

In 1953, the first regularly scheduled helicopter passenger service was inaugurated on a restricted scale in the New York area. Inter-airport passenger service was begun between LaGuardia, Idlewild and Newark airports. Other helicopter mail operations in Los Angeles and Chicago continued to expand, but neither has yet added a passenger service.

In addition to the promising outlook for helicopter usage in carrying passengers and mail on regularly scheduled routes, the helicopter's ability to rise and descend vertically is expected to result in increasing specialized civil and industrial use.

The airlines may well be among the industry's major civil customers, according to preliminary reports of a special Air Transport Association Helicopter Committee studying this craft's adaptability to scheduled operations. Near year's end, one airline, National, had announced the purchase of its first helicopter.

TABLE 7–1. TOTAL CIVIL AIRCRAFT,[a] 1927–1952

As of December 31	Number	As of December 31	Number
1927	2,740	1940	17,928
1928	5,104	1941	26,013
1929	9,922	1942	27,170
1930	9,818	1943	27,180
1931	10,680	1944	27,919
1932	10,324	1945	37,789
1933	9,284	1946	81,002[b]
1934	8,322	1947	94,821[b]
1935	9,072	1948	95,997[b]
1936	9,229	1949	92,622[b]
1937	10,836	1950	92,809[b]
1938	11,159	1951	88,545[b]
1939	13,772	1952	89,313[b]

[a] Includes airliners.

[b] Includes gliders.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 25; brought up to date from CAA files.

TABLE 7–2. CIVIL AIRCRAFT[a] BY YEAR OF MANUFACTURE
AS OF JANUARY 1, 1953

Year of Manufacture	Number	Percent of Total
	89,313	100.0
1941	6,567	7.3
1942	4,741	5.3
1943	6,254	7.0
1944	1,591	1.8
1945	1,940	2.2
1946	27,521	30.8
1947	11,325	12.7
1948	5,569	6.2
1949	2,767	3.1
1950	2,973	3.3
1951	1,930	2.2
1952	2,847	3.2
Other years	13,288	14.9

[a] Includes airliners.

Source: Civil Aeronautics Administration, "Statistical Study of U. S. Civil Aircraft as of January 1, 1953, p. 4.

TABLE 7–3. CIVIL AIRCRAFT[a] BY STATES, JANUARY 1, 1953

State	Total	Active	Inactive	State	Total	Active	Inactive
TOTAL	89,313	54,037	35,276				
Alabama	752	428	324	Nebraska	1,790	1,277	513
Arizona	1,164	637	527	Nevada	439	238	201
Arkansas	1,080	616	464	New Hampshire	221	129	92
California	10,067	5,634	4,433	New Jersey	1,826	998	828
Colorado	1,263	784	479	New Mexico	754	418	336
Connecticut	603	318	285	New York	4,397	2,693	1,704
Delaware	275	114	161	North Carolina	1,547	915	632
District of Columbia	554	368	186	North Dakota	1,183	682	501
Florida	2,612	1,213	1,399	Ohio	4,157	2,527	1,630
Georgia	1,169	476	693	Oklahoma	2,026	1,282	744
Idaho	906	610	296	Oregon	1,747	1,079	668
Illinois	4,923	3,236	1,687	Pennsylvania	3,925	2,362	1,563
Indiana	2,679	1,669	1,010	Rhode Island	187	92	95
Iowa	2,126	1,572	554	South Carolina	598	341	257
Kansas	2,477	1,694	783	South Dakota	1,112	801	311
Kentucky	655	385	270	Tennessee	919	534	385
Louisiana	1,159	722	437	Texas	6,581	4,076	2,505
Maine	550	338	212	Utah	456	264	192
Maryland	837	462	375	Vermont	163	103	60
Massachusetts	1,425	910	515	Virginia	1,267	690	577
Michigan	3,876	2,225	1,651	Washington	2,219	1,356	863
Minnesota	2,092	1,382	710	West Virginia	609	317	292
Mississippi	802	474	328	Wisconsin	1,995	1,293	702
Missouri	1,924	1,279	645	Wyoming	509	355	154
Montana	1,165	805	360	Territories and Foreign	1,551	864	687

[a] Includes airliners.

Source: Civil Aeronautics Administration, "Statistical Study of U. S. Civil Aircraft as of January 1, 1953," p. 2.

TABLE 7–4. ACTIVE CIVIL AIRCRAFT[a] BY TOTAL RATED TAKE-OFF HORSEPOWER JANUARY 1, 1953

ONE-ENGINE

Total	Horsepower						
	1–50	51–100	101–200	201–350	351–500	501–700	Over 700
49,954	87	26,818	13,003	8,040	1,913	66	27

TWO-ENGINE

Total	Horsepower			
	1–600	601–2000	2001–4000	Over 4000
2,877	708	868	1,028	273

THREE-ENGINE

Total	Horsepower		
	1–700	701–1000	Over 1000
2	—	2	—

FOUR-ENGINE

Total	Horsepower			
	1–5000	5001–6000	6001–10,000	Over 10,000
576	7	201	300	68

[a] Includes only the 53,409 aircraft produced by major aircraft manufacturers.

Source: Civil Aeronautics Administration, "Statistical Study of U. S. Civil Aircraft as of January 1, 1953," pp. 3, 4.

TABLE 7–5. CERTIFICATED CIVIL PILOTS AND STUDENT PILOTS, 1927–1952

As of December 31	Certificated Airplane Pilots				Student Pilot Approvals During Year	Glider Pilots
	TOTAL PILOTS	Airline Transport	Commercial	Private		
1927	1,572	[a]	N.A.	N.A.	545	—
1928	4,887	[a]	N.A.	N.A.	9,717	—
1929	10,287	[a]	6,053	4,162	20,400	—
1930	15,280	[a]	7,847	7,433	18,398	178
1931	17,739	[a]	8,513	9,226	16,061	267
1932	18,594	330	7,967	10,297	11,325	209
1933	13,960	554	7,635	5,771	12,752	149
1934	13,949	676	7,484	5,789	11,994	109
1935	14,805	736	7,362	6,707	14,572	145
1936	15,952	842	7,288	7,822	17,675	138
1937	17,681	1,064	6,411	10,206	21,770	161
1938	22,983	1,159	7,839	13,985	15,556	172
1939	33,706	1,197	11,677	20,832	29,839	170
1940	69,829	1,431	18,791	49,607	110,938	138
1941	129,947	1,587	34,578	93,782	93,366	160
1942	166,626	2,177	55,760	108,689	93,777	211
1943	173,206	2,315	63,940	106,951	36,802	1,435
1944	183,383	3,046	68,449	111,888	51,276	2,412
1945	296,895	5,815	162,873	128,207	77,188	2,438
1946	400,061	7,654	203,251	189,156	173,432	N.A.
1947	433,241[b]	7,059[b]	181,912[b]	244,270[b]	192,924	2,995[b]
1948	491,306[c]	7,762[c]	176,845[c]	306,699[c]	117,725	3,143[c]
1949	525,174	9,025	187,769	328,380	49,575	3,291
1950	[d]	[d]	[d]	[d]	44,591	[d]
1951	580,574	10,813	197,900	371,861	45,003	3,300
1952[e]	573,596	10,898	191,524	371,174	30,537	3,324

N.A.—Not available.

[a] Airline Transport Rating became effective May 5, 1932.

[b] As of April 1, 1948.

[c] As of May 1, 1949.

[d] No survey made.

[e] As of July 1, 1952.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 25; brought up to date from CAA files.

TABLE 7–6. HOURS FLOWN BY UTILITY AIRCRAFT, 1931–1951

Calendar Year	TOTAL (Thousands of Hours)	Instructional		Commercial[a]		Business[b]		Pleasure and Other	
		Thousands of Hours	Percent	Thousands of Hours	Percent	Thousands of Hours	Percent	Thousands of Hours	Percent
1931	1,083	307	28.3	281	25.9	152	14.1	343	31.7
1932	877	223	25.4	215	24.5	130	14.8	309	35.3
1933	795	198	24.9	200	25.2	129	16.2	268	33.7
1934	846	217	25.6	207	24.5	121	14.3	301	35.6
1935	954	292	30.6	229	24.0	132	13.8	301	31.6
1936	1,059	380	35.9	245	23.1	122	11.5	312	29.5
1937	1,173	432	36.8	227	19.4	156	13.3	358	30.5
1938	1,478	577	39.0	254	17.2	188	12.7	459	31.1
1939	1,922	755	39.3	332	17.3	246	12.8	589	30.6
1940	3,200	1,529	47.8	387	12.1	314	9.8	970	30.3
1941	4,460	2,816	63.1	511	11.5	250	5.6	883	19.8
1942	3,786	2,680	70.8	473	12.5	270	7.1	363	9.6
1943	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1944	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1945	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1946	9,788	5,996	61.2	943	9.7	1,068	10.9	1,781	18.2
1947	16,334	10,353	63.4	1,279	7.8	1,966	12.0	2,736	16.8
1948	15,130	8,701	57.5	1,066	7.1	2,576	17.0	2,787	18.4
1949	11,031	4,187	38.0	1,449	13.1	2,615	23.7	2,780	25.2
1950	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1951	8,451	1,902	22.5	1,584	18.8	2,950	34.9	2,015	23.8
1952	8,186	1,503	18.4	1,727	21.1	3,124[c]	38.2	1,832	22.3

N.A.—Not available.

[a] Includes contract, charter, industrial, and commercial agricultural flying.

[b] Includes flying for corporate or executive purposes as well as flying on personal business.

[c] Company Business 2.1 million hours, Individual Business 1.; million hours.

Source: Civil Aeronautics Administration, "Aircraft Use in 1951," p. 36. Brought up to date by CAA.

TABLE 7–7. ESTIMATED MILES FLOWN BY UTILITY AIRCRAFT,[a] 1931–1951

Calendar Year	TOTAL Million Miles	Instructional		Commercial		Business		Pleasure	
		Million Miles	Percent	Million Miles	Percent	Million Miles	Percent	Million Miles	Percent
1931	94.3	25.3	26.8	26.5	28.1	13.4	14.2	29.1	30.9
1932	78.2	17.9	22.8	21.7	27.7	12.3	15.8	26.3	33.7
1933	71.2	15.9	22.3	20.2	28.4	12.4	17.4	22.7	31.9
1934	75.6	17.3	23.0	21.0	27.7	11.7	15.5	25.6	33.8
1935	84.5	23.4	27.6	23.2	27.3	12.4	14.9	25.5	30.2
1936	93.3	30.4	32.6	24.6	26.4	11.8	12.6	26.5	28.4
1937	103.2	34.6	33.5	22.6	21.9	15.6	15.1	30.4	29.5
1938	129.3	46.1	35.7	25.4	19.6	18.8	14.6	39.0	30.1
1939	177.9	66.4	37.3	34.3	19.3	25.4	14.3	51.8	29.1
1940	264.0	126.2	47.8	32.0	12.1	25.9	9.8	79.9	30.3
1941	346.3	197.1	56.9	51.1	14.8	27.4	7.9	70.7	20.4
1942	293.6	187.6	63.9	47.3	16.1	29.7	10.1	29.0	9.9
1943	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1944	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1945	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1946	874.7[b]	478.8	54.7	107.9	12.3	121.5	13.9	156.7	17.9
1947	1,502.4[c]	848.7	56.5	150.2	10.1	228.1	15.3	262.1	17.4
1948	1,469.5[d]	754.7	51.4	142.6	9.7	298.9	20.3	255.2	17.4
1949	1,129.0[e]	378.7	33.5	166.1	14.7	309.1	27.4	269.9	23.9
1950	N.A.	N.A.	—	N.A.	—	N.A.	—	N.A.	—
1951	994.8[f]	190.2	19.1	209.8	21.1	379.8	38.2	200.3	20.1

N.A. Not available.

[a] Excludes scheduled air carriers.

[b] Includes 9,795,000 miles not classified as to type of flying.

[c] Includes 13,305,000 miles not classified as to type of flying.

[d] Includes 18,065,000 miles not classified as to type of flying.

[e] Includes 5,240,000 miles not classified as to type of flying.

[f] Includes 14,700,000 miles not classified as to type of flying.

Source: Civil Aeronautics Administration "Statistical Handbook of Civil Aviation, 1950," p. 38; brought up to date from CAA files.

TABLE 7–8. ESTIMATED MILES FLOWN BY UTILITY AIRCRAFT, 1951

Type of Flying	Miles Flown (in thousands)				
	ALL TYPES	Single Engine		Multi-Engine	All Others[a]
		1 and 2 places	3 or more places		
TOTAL—ALL TYPES	994,765	435,230	412,585	145,600	1,350
Instructional	190,195	126,935	52,925	9,975	360
Commercial	209,765	98,395	74,705	36,575	90
Business	379,845	96,885	197,295	85,575	90
Pleasure	200,265	105,980	81,845	11,900	540
Other	14,695	7,035	5,815	1,575	270

[a] Includes gliders, helicopters, autogiros, and unspecified.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 38; brought up to date from CAA files. Grouping done by AIA.

TABLE 7–9. NUMBER OF AIRCRAFT AND HOURS FLOWN IN UTILITY FLYING, 1951

Type of Aircraft	Aircraft		Hours Flown		Average Hours Flown Per Aircraft[a]
	Aircraft	Percent	Hours (in thousands)	Percent	
TOTAL	82,236	100	8,613	100	105
Single engine, 1 or 2 places	56,812	69	4,763	55	84
Single engine, 3 or more places	21,086	26	3,003	35	142
Multi-engine	3,363	4	832	10	247
All Other	975	1	15	[b]	15

[a] The average hours flown include aircraft which were registered but did no flying during the year. If the aircraft which did no flying were excluded the average number of hours flown would be substantially larger.

[b] Less than one half of one percent.

Source: Civil Aeronautics Administration, "Aircraft Use in 1951," Table 4.

TABLE 7–10. COMMERCIAL AGRICULTURAL FLYING, 1951

Type of Flying	*Million Acres Treated*
Dusting	17.6
Spraying	12.9
Fertilizer	2.1
Seeding	2.1
Defoliation	1.7
Spraying towns	1.6
Baiting grasshoppers for pest control	.6

Source: Civil Aeronautics Administration, "Aircraft Use in 1951," p. 7, 8.

TABLE 7–11. CIVIL AIRPLANE PRODUCTION[a]

1936–1945, by Number of Engines and Places

Year	TOTAL PRODUCTION	By Number of Engines[b]		Landplanes, by Place[c]		
		Single	Multi	1–2	3–5	Over 5
1936	1,637[d]	1,526	111	N.A.	N.A.	N.A.
1937	2,289[d]	2,171	118	1,668	460	105
1938	1,823	1,770	53	1,487	258	42
1939	3,715[d]	3,613	102	3,118	465	76
1940	6,785	6,562	167	5,527	1,031	140
1941	6,844	6,629	165	6,060	573	115
1945	2,047	1,946	101	1,929	17	73

1946–1952, by Type of Use and Number of Places

Year	TOTAL PRODUCTION	By Type of Use		By Place		
		General	Transports	1–2	3–5	Over 5
1946	35,001	34,568	433	30,766	3,802	433
1947	15,617	15,339	278	7,273	8,066	278
1948	7,302	7,039	263	3,302	3,737	263
1949	3,545	3,379	166	996	2,383	166
1950	3,520	3,391	129	1,029	2,362	129
1951	2,477	2,279	198	614	1,661	202
1952	3,509	3,057	452	3,056		453

N.A.—Not available.

[a] Includes airliners.

[b] Excludes those unclassified.

[c] Excludes seaplanes, amphibians, and those unclassified.

[d] Civil airplane production shown here differs from that on Table 2–6. Recent CAA revision of total civil airplane production not yet carried through all breakdowns.

Sources: 1936–1950: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 43.

1951–1952: Bureau of the Census, "Facts for Industry," Series M42A, (Monthly).

TABLE 7–12. CIVIL AIRPLANE PRODUCTION, BY HORSEPOWER OF ALL ENGINES, 1936–1952

1936–1945

Year	Total Production	Horsepower			
		1–70	71–100	101–300	Over 300
1936	1,637[b]	881	122	460	174
1937	2,289[b]	1,437	183	439	230
1938	1,823	1,373	61	287	102
1939	3,715[b]	3,035	311	215	154
1940[a]	6,785	5,019	935	566	209
1941[a]	6,844	4,310	1,805	530	149
1945	2,047	1,828	105	13	101

1946–1952

Year	Total Production	Horsepower				
		1–74	75–99	100–399	400–3,999	4,000 & over
1946	35,001	20,659	9,122	4,736	345	139
1947	15,617	2,372	4,690	8,246	129	180
1948	7,302	2,990		4,026	286	
1949	3,545	930		2,441	174	
1950	3,520	597		2,789	134	
1951	2,477	150		2,123	204	
1952	3,509	85		2,971	453	

[a] Totals include 56 unclassified planes in 1940 and 50 in 1941 not shown in breakdowns.

[b] Civil airplane production shown here differs slightly from that on Table 2–6. Recent CAA revision of total civil airplane production not yet carried through all breakdowns.

Sources: 1936–1950: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 43.

1951–1952: Bureau of the Census, "Facts for Industry," Series M42A (Monthly).

TABLE 7–13. SELECTED DATA ON BUSINESS-OWNED UTILITY AIRCRAFT, 1952

Estimated number of planes operated:	Over 1,800 multi-engined About 7,800 single-engined
Average utilization per year:	About 600 hours per plane
Flying hours:	3,250,000 hours
Available seats:	40,000
Estimated total investment in planes and facilities:	$200,000,000
Estimated annual expense in keeping aircraft in operation (including conversions and purchase of new aircraft):	$175,000,000

Source: National Business Aircraft Association.

TABLE 7–14. ESTIMATED COST OF OPERATING A TYPICAL 125–150 HORSEPOWER UTILITY AIRCRAFT SEATING FOUR PEOPLE

	Use Per Year		
	300 Hours	500 Hours	1000 Hours
Gas and oil	$ 820.50	$1,367.50	$2,735.00
Maintenance and overhaul	375.00	625.00	1,250.00
Hangar	300.00	300.00	300.00
Depreciation	1,141.00	1,141.00	1,141.00
Insurance	703.24	703.24	703.24
Total cost per year	$3,339.74	$4,136.74	$6,129.24
Cost per hour	$11.13	$8.27	$6.13
Cost per mile (120 m.p.h.)	9.3¢	6.9¢	5.1¢
Cost per seat-mile	2.3¢	1.7¢	1.3¢

Source: Cessna Aircraft Company, "How Much Does It Cost to Operate the Cessna 170?"

TABLE 7–15. TYPE OF CIVIL FLYING ACCIDENTS
1952
(Percent)

Type	Domestic Scheduled Airlines	Domestic Non-Scheduled Airlines	Utility Aircraft
TOTAL	100.0	100.0	100.0
Landing or Take-off	44.9	57.1	46.2
Collision	18.4	42.9	37.3
Stall	2.0	—	7.8
Fire	6.1	—	.2
Airframe	8.2	—	6.6
Other (including in process)	20.4	—	1.8

Source: Civil Aeronautics Board, Accident Analysis Division.

TABLE 7–16. CAUSE OF CIVIL FLYING ACCIDENTS
1952
(Percent)

Cause	Domestic Scheduled Airlines	Domestic Non-Scheduled Airlines	Utility Aircraft
TOTAL	100.0	100.0	100.0
Pilot Error	36.7	57.1	69.5
Other Personnel Error	10.2	—	6.8
Structural Failures	14.3	28.6	4.7
Power Plant	8.2	14.3	5.9
Weather	14.3	—	5.2
Airport Terrain	2.0	—	7.5
Other (including in process)	14.3	—	.4

Source: Civil Aeronautics Board, Accident Analysis Division.

TABLE 7–17. INSURANCE RATES FOR A UTILITY AIRCRAFT
(Cost $8,500, 150 H.P.)

All Risks ($50 deductible on ground losses except fire and theft)	$253
In Flight Coverage ($50 deductible)	297
Liability	153
TOTAL	$703

Source: Cessna Aircraft Corporation, "How Much Does It Cost a Year to Operate the Cessna 170?"

TABLE 7–18. UTILITY AIRCRAFT: FATAL ACCIDENTS
1930–1952

Year	Fatal Accidents	Total Fatalities	Million Plane-Miles Per Fatal Accident	Million Plane-Miles Per Fatality
1930	300	504	.4	.2
1931	251	398	.4	.2
1932	207	318	.4	.2
1933	177	299	.4	.2
1934	184	323	.4	.2
1935	161	253	.5	.3
1936	155	261	.6	.4
1937	184	280	.6	.4
1938	176	274	.7	.5
1939	203	315	.9	.6
1940	232	359	1.1	.7
1941	217	312	1.6	1.1
1942	143	220	2.0	1.3
1943	167	257	N.A.	N.A.
1944	169	257	N.A.	N.A.
1945	322	508	N.A.	N.A.
1946	690	1,009	1.3	.9
1947	882	1,352	1.7	1.1
1948	850	1,384	1.7	1.1
1949	562	896	2.0	1.3
1950	499	871	N.A.	N.A.
1951	441	750	N.A.	N.A.
1952	401	691	N.A.	N.A.

N.A.—Not available.

Source: Civil Aeronautics Administration "Statistical Handbook of Civil Aviation, 1950", page 105. Civil Aeronautics Board, Accident Analysis Division.

TABLE 7–19. HELICOPTERS IN PRODUCTION
October 15, 1953

Producer	No. of Places	H.P.	Comm'l Desgn.	Military Designation				
				USAF	USA	USCG	USMC	USN
Bell								
2 Models	3	200	47G	H13G	H13G	—	—	—
	16	1900	—	—	—	—	—	HSL–1
Doman								
2 Models	2–8	400	LZ–5	—	—	—	—	—
	2–6	400	YH–31	—	YH–31	—	—	—
Hiller								
2 Models	3	200	12–B	—	H–23B	—	—	—
	2	70	Hornet	—	YH–32	—	—	HJ–1
Kaman								
2 Models	3	245	K–240	—	—	—	—	HTK–1
	4	525	K–3	—	—	—	—	HOK–1
Piasecki								
4 Models	6	550	—	—	H–25	—	—	HUP–2
	16	1150	—	YH–21 H–21A	—	—	—	—
	22	1425	—	H–21B	H–21C	—	—	—
	44	3300	—	YH–16	—	—	—	—
Sikorsky[a]								
3 Models	10–12	600–700	S–55	YH–19 H–19A H–19B	H–19C H–19D	HO4S–2 HO4S–3	HRS–2 HRS–3	—
	N.A.	N.A.	S–56	H–37A	H–37A	—	HR2S–1	HR2S–1
	N.A.	N.A.	S–58	H–34A	H–34A	—	HUS–1	HSS–1

NA—Not available.
[a] S–51 model in production in England.

CHAPTER VIII

EXPORTS AND AID TO FOREIGN COUNTRIES

Since 1950, more than 4,000 military aircraft have been shipped overseas to U. S. allies under the Military Defense Assistance Program, and a few civil planes and equipment have been sent to foreign nations by the Mutual Security Agency.

In addition to providing these complete aircraft to allied countries, the United States government has underway a program to foster European military aircraft production. This program, designed to develop native production capacity and self-sufficiency, calls for production in Europe of 1,725 military aircraft, at a total estimated cost of about $580 million, over the next several years.

The current aid program in many respects follows that of World War II, when the U. S. aircraft industry shipped 45,000 airplanes to members of the United Nations. Lend-lease shipments of aeronautical products exceeded eight billion dollars in value during the war years.

Exports Essential to Industry Welfare

Only a few industries export a greater percentage of their production than does the civil aircraft industry. The average for all industries is less than 10 per cent, compared with 25 per cent for the U. S. civil aircraft industry in normal years.

Military aircraft exports vary from extremely low levels in some peacetime years to as much as 50 per cent of total production in others.*

Purchases by foreign nations of U. S. aircraft and equipment in the past have been of great importance to the American aircraft industry. In 1914, about 25 percent of the output of the small U. S. aircraft industry was sold abroad. During the depression year of 1933, in another instance, exports of $9 million worth of aeronautical equipment (out of a total production of $26.5 million worth of aircraft and parts) did much to save several companies from financial ruin.

Competition for Foreign Markets

U. S. aeronautical exports are several times larger in dollar volume than those of the nearest foreign competitor, the United Kingdom. British exports, however, represent a greater proportion of British aircraft production.

*The term military exports, as used in this volume, refers solely to shipments to other governments and does not include shipments to U. S. bases or forces abroad.

The British aircraft industry receives greater assistance from its Foreign Office representatives in promoting aircraft sales than does the American industry. Even in the case of military aircraft exports, U. S. government restrictions both on type of aircraft and on permissible destination of shipments have been far stricter than those of the British.

The major assistance received by the American aircraft industry from the government in the export field is obtained from reports filed by embassies, legations and consulates.

A shortage of dollar exchange in many parts of the world since World War II also has made the export problem difficult for U. S. manufacturers.

Despite these handicaps, it is anticipated that total exports of aeronautical products (Military Defense Assistance Program, Foreign Operations Administration, and regular commercial and utility aircraft shipments) will approximate $900 million during 1953.

Sources of Data

The major source for statistics on aeronautical exports is the Foreign Trade Division of the Bureau of the Census. Industry and government work together in preparing and classifying statistics on commodities exported from the United States.

Other sources of statistical information on aeronautical exports are the Export Service of the Aircraft Industries Association (for utility aircraft), the Foreign Operations Administration (formerly Mutual Security Agency), and the Office of Miiltary Assistance of the Department of Defense.

Since 1949, few dollar figures for aeronautical exports by classes have been published. Detailed export figures for military, cargo and used transport aircraft, for all engines of 400 horsepower and over, for propellers, instruments and all accessories, and for spare parts and aircraft ground-handling equipment have been lumped into a "Special Category" for security reasons. Only recently has a total dollar figure for all aeronautical exports been made available.

TABLE 8–1. U. S. TOTAL EXPORTS AND EXPORTS OF AERONAUTIC PRODUCTS 1912 TO DATE
(Millions of Dollars)

Year	Total United States Merchandise	Total Aeronautic Products[a]	Percent of total
1912	$ 2,170.3	$ .1	[b]
1913	2,428.5	.1	[b]
1914	2,329.7	.2	[b]
1915–1918	22,176.7	31.5	.14
1919	7,749.8	3.5	[b]
1920	8,080.5	1.1	[b]
1921	4,378.9	.5	[b]
1922	3,765.1	.5	[b]
1923	4,090.7	.4	[b]
1924	4,497.6	.8	[b]
1925	4,818.7	.8	[b]
1926	4,711.7	1.0	[b]
1927	4,758.9	1.9	[b]
1928	5,031.1	3.7	.07
1929	5,157.1	9.1	.18
1930	3,781.2	8.8	.23
1931	2,378.0	4.9	.2
1932	1,576.2	7.9	.5
1933	1,647.2	9.2	.6
1934	2,100.1	17.7	.8
1935	2,243.1	14.3	.6
1936	2,419.0	23.1	1.0
1937	3,298.9	39.4	1.2
1938	3,057.2	68.2	2.2
1939	3,123.3	117.8	3.8
1940	3,934.2	311.9	7.9
1941	5,019.9	626.9	12.5
1942	8,003.1	1,357.3	17.0
1943	12,841.5	2,142.1	16.7
1944	14,161.5	2,818.2	19.9
1945	9,584.7	1,148.9	12.0
1946	9,500.2	115.3	1.2
1947	14,252.3	172.2	1.2
1948	12,532.1	153.6	1.2

TABLE 8–1. U. S. TOTAL EXPORTS AND EXPORTS OF AERONAUTIC PRODUCTS 1912 TO DATE—*Continued*

(Millions of Dollars)

Year	Total United States Merchandise	Total Aeronautic Products[a]	Percent of total
1949	$ 11,936.1	$ 283.0	2.4
1950	10,142.4	242.4	2.4
1951	14,879.5	301.4	2.0
1952	15,025.7	603.2	4.0
1953 (3 mos.)	3,843.4	205.5	5.3

[a] Export figures include both new and second hand equipment. Due to use of different sources, data on Tables 8–1 and 8–2 may differ slightly.

[b] Less than .05 percent.

Sources: 1912–1948: Bureau of the Census: "Historical Statistics of the United States 1789–1945," p. 243 ff; brought up to date from "Statistical Abstract of the United States," 1946–1949.

1949 to date, Bureau of the Census, "Report FT 410," and "Foreign Trade Statistics Notes," June 1953, p. 80.

TABLE 8–2. U. S. EXPORTS OF AERONAUTIC PRODUCTS, BY TYPE[a] 1912 TO DATE

Year[b]	TOTAL VALUE, (Thousands of Dollars)	Aircraft[c]		Engines		Parts and Accessories Value, (Thousands)	Parachutes and Parts Value, (Thousands)
		Number	Value, (Thousands)	Number	Value, (Thousands)		
1912	$ 106	29	$ 106	Not reported prior to 1922, probably included with "other" internal-combustion engines or "parts" of aircraft		—	Not reported until 1932
1913	108	29	82			$ 26	
1914	226	34	189			37	
1915	1,541	152	958			583	
1916	7,002	269	2,158			4,844	—
1917	4,136	135	1,002	—	—	3,134	—
1918	9,084	20	206	—	—	8,878	—
1918 (second half)	9,702	41	562	—	—	9,140	—
1919	3,464	44	215	—	—	3,249	—
1920	1,153	65	598	—	—	555	—
1921	473	48	315	—	—	158	—
1922	495	37	157	147	$ 73	265	—
1923	434	48	309	80	66	59	—
1924	798	59	413	146	219	166	—
1925	784	80	511	73	171	102	—
1926	1,027	50	303	297	574	150	—
1927	1,904	63	849	84	485	570	—
1928	3,665	162	1,760	179	665	1,240	—
1929	9,125	348	5,485	322	1,383	2,257	—
1930	8,818	321	4,820	376	1,635	2,363	—
1931	4,868	140	1,813	307	1,432	1,623	—
1932	7,946	280	4,359	2,356[d]	1,518	1,756	$ 313
1933	9,180	406	5,392	2,903[d]	1,452	2,249	87
1934	17,663	490	8,195	1,009	4,459	4,861	148
1935	14,291	333	6,599	568	2,459	5,070	163
1936	23,143	527	11,602	933	5,183	6,060	298
1937	39,404	631	21,085	1,048	5,946	12,105	268
1938	68,228	876	37,978	1,309	7,900	21,949	401
1939	117,806	1,221	67,112	1,880	14,120	35,799	775

TABLE 8-2. U. S. EXPORTS OF AERONAUTIC PRODUCTS, BY TYPE 1912 TO DATE—*Continued*

Year[b]	TOTAL VALUE, (Thousands of Dollars)	Aircraft[c]		Engines		Parts and Accessories Value, (Thousands)	Parachutes and Parts Value, (Thousands)
		Number	Value, (Thousands)	Number	Value, (Thousands)		
1940	$ 311,872	3,531	$ 196,266	4,986	$ 49,874	$ 64,663	$ 1,069
1941[e]	626,929	6,011	422,764	8,144	81,693	121,757	715
1942[e]	1,357,345	10,500	884,766	14,603	160,575	311,537	467
1943[e]	2,142,612	13,897	1,217,038	21,803	243,650	680,109	1,815
1944[e]	2,818,171	24,405	1,646,169	25,751	335,081	830,220	6,701
1945[e]	1,204,823	7,290	650,108	9,351	126,210	427,241	1,264
1946[f]	115,318	2,406	65,294	2,490	11,851	37,389	784
1947	175,523	3,163	74,502	4,138	18,075	82,946	
1948	156,847	2,262	66,358	3,924	14,337	76,152	
1949	282,984	N.A.	N.A.	N.A.	N.A.	N.A.	
1950	242,363	N.A.	N.A.	N.A.	N.A.	N.A.	
1951	301,425	N.A.	N.A.	N.A.	N.A.	N.A.	
1952	603,182	N.A.	N.A.	N.A.	N.A.	N.A.	
1953 (3 mos)	205,459	N.A.	N.A.	N.A.	N.A.	N.A.	

N.A.—Not available.

[a] No breakdown available between new and secondhand exports. Due to use of different sources, "Total Value" of aeronautic exports on Tables 8-1 and 8-2 may differ slightly.

[b] Fiscal years (ending June 30) prior to 1919; later data for calendar years.

[c] Complete aircraft including engines, propellers, etc.

[d] Russia bought 2,010 engines for $261,344 in 1932 and 2,576 for $255,400 in 1933.

[e] Includes lend-lease shipments.

[f] Includes shipments made under UNRRA.

Sources: 1912-1942: U. S. Department of Commerce, "Foreign Commerce and Navigation of the United States," annually.

1943-1946: U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Machinery and Motive Products Unit.

1947-1948: Bureau of the Census, Report FT 410.

1949 to date: Bureau of the Census, "Foreign Trade Statistics Notes," June 1953, p. 80.

TABLE 8–3. UNITED STATES EXPORTS[a] OF AERONAUTIC PRODUCTS, BY DESTINATION 1929–1948

	TOTAL	Other Americas	Europe	U.S.S.R.	Rest of the World
AIRCRAFT					
Number:					
1929	348	281	13	—	54
1938	876	324	131	13	408
1944	24,045	1,207	11,874	4,585	6,739
1948	2,262	1,405	119	—	738
Value, thousands:					
1929	$ 5,485	$ 4,315	$ 237	—	$ 933
1938	37,978	10,390	4,648	$ 1,970	20,970
1944	1,646,168	88,161	512,768	399,989	645.250
1948	66,358	22,744	21,584	—	22,030
ENGINES					
Number:					
1929	322	144	130	2	46
1938	1,309	436	535	19	319
1944	25,751	7,780	12,008	2,699	3,264
1948	3,924	1,691	788	—	1,445
Value, thousands:					
1929	$ 1,384	$ 568	$ 617	$ 20	$ 179
1938	7,900	1,331	3,951	172	2,446
1944	335,081	87,396	170,726	36,128	40,831
1948	14,337	4,846	4,601	—	4,890
AIRCRAFT PARTS					
Value, thousands:					
1929	$ 2,258	$ 1,390	$ 304	$ 225	$ 339
1938[b]	22,351	4,408	4,442	3,030	10,471
1944[b]	836,920	113,983	409,591	121,988	171,359
1948[b]	72,943	22,982	27,978	88	21,895

Note: No breakdowns of exports of aeronautic products have been published since 1948.

[a] Includes lend-lease.

[b] Includes parachutes and parts.

Sources: 1929 and 1938: Condensed fro a U. S. Department of Commerce, "Foreign Commerce and Navigation of the United States," 1929, p 174; 1938, pp. 603–604.

1944: U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce, Machinery and Motive Products Unit.

1948: Bureau of the Census, Report FT 410, Calendar Year 1948, pp. 128–131.

TABLE 8-4. EXPORTS OF CIVIL AIRCRAFT, 1948-1952

NEW PASSENGER TRANSPORTS

Year	TOTAL		3,000-14,999 lbs airframe weight		15,000-29,999 lbs airframe weight		30,000 lbs & over airframe weight	
	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)
1948	91	$37.4	34	$2.4	14	$4.2	43	$30.8
1949	51	22.2	16	1.3	25	7.6	10	13.4
1950	48	40.4	4	.4	15	6.6	29	33.4
1951	26	13.2	13	1.1	1	[a]	12	12.1
1952	25	18.2	9	.6	1	.6	15	17.0

NEW UTILITY, PERSONAL AND LIAISON PLANES

Year	TOTAL		3-Places or less		4-Places and over	
	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)
1948	935	$4.2	552	$1.5	383	$2.7
1949	510	2.8	235	.7	275	2.1
1950	408	2.2	173	.5	235	1.7
1951	540	3.7	237	1.0	303	2.7
1952	815	5.6	551	3.1	264	2.5

OTHER

Year	Rotary Wing Aircraft		Used Aircraft and Surplus Liaison Aircraft	
	Number	Value (Millions of dollars)	Number	Value (Millions of dollars)
1948	47	$1.9	202	$ .7
1949	31	1.2	252	.6
1950	38	.9	262	.9
1951	28	.9	300	.9
1952	37	1.4	303	1.5

[a] Less than $500,000.

Source: Bureau of the Census, "Facts for Industry," Series M42A (Monthly).

TABLE 8–5. EXPORT OF AIRCRAFT ENGINES[a] FOR CIVILIAN AIRCRAFT, 1948–1952

Year	Number	Value (Thousands of dollars)
1948[b]	660	$326
1949[b]	107	112
1950	247	285
1951	304	509
1952	551	941

[a] Under 400 h.p.; data for exports of engines of 400 h.p. and over withheld for "security reasons."
[b] Under 250 h.p.
Source: Bureau of the Census, "Facts for Industry," Series M42A (Monthly).

TABLE 8–6. LEND-LEASE OF AERONAUTIC PRODUCTS DURING SECOND WORLD WAR, BY TYPE
(Millions of Dollars)

Period	Lend-Lease		Percent Aeronautic Products of Total
	Total	Aeronautic Products	
March 11, 1941 to December 1945	$46,517	$8,206	17.6

TOTAL AERONAUTIC PRODUCTS	$8,206.1
TOTAL AIRCRAFT	5,335.3
Bombers	2,678.7
Pursuit and Fighter Planes	1,782.4
Other Planes	874.2
OTHER AERONAUTIC MATERIAL	2,870.8
Spare Engines and Parts	1,135.8
Propellers and Parts	244.5
Other Equipment	1,490.5

Source: Twenty-second Report to Congress on Lend-Lease Operations, June 14, 1946, pp. 17, 24.

TABLE 8–7. LEND-LEASE AIRCRAFT SHIPMENTS DURING THE SECOND WORLD WAR BY DESTINATION, MARCH 11, 1941 TO DECEMBER 31, 1945
(Approximate figures)

Destination	Number of Aircraft
TOTAL	45,000
United Kingdom	10,700
Soviet Union	14,800
Asiatic and Pacific Theater	8,800
Africa, Middle East, Mediterranean, Canada, South America, etc.	10,700

Source: Twenty-First Report to Congress on Lend-Lease Operations, January 31, 1946, pp. 15, 22, 25, 30.

TABLE 8–8. LEND-LEASE OF AERONAUTIC PRODUCTS DURING THE SECOND WORLD WAR, BY DESTINATION, MARCH 11, 1941 TO DECEMBER 31, 1945
(Millions of dollars)

Destination	TOTAL	Aircraft	Aircraft Engines, Parts, etc.
TOTAL	$8,206.2	$5,335.3	$2,870.9
British Empire	$6,028.6	$3,684.9	$2,343.7
Soviet Union	1,564.4	1,189.2	375.2
Other Countries	613.2	461.2	152.0

Source: Twenty-Second Report to Congress on Lend-Lease Operations, June 14, 1946, p. 26.

TABLE 8–9. MUTUAL SECURITY PROGRAM, AUTHORIZATION AND SHIPMENTS OF CIVIL AIRCRAFT, ENGINES, AND PARTS, 1948 TO DATE
(Millions of dollars)

Program	Procurement Authorizations			Paid Shipments
	Total	Area of Source		
		U. S.	Other	
TOTAL	$115.4	$113.3	$2.1	$97.3
European[a]	$113.3	$112.9	$ .4	$97.0
Far East[b]	2.1	.4	1.7	.3

[a] Authorizations: April 3, 1948—April 30, 1953. Paid Shipments: April 3, 1948—March 31, 1953.
[b] Authorizations: June 5, 1950—April 30, 1953. Paid Shipments: June 5, 1950—March 31, 1953.
Sources: Mutual Security Agency, "Procurement Authorizations and Allotments," SR 6, pp. 17, 31. Mutual Security Agency, "Paid Shipments," SR 26, pp. 11, 27.

TABLE 8–10. MUTUAL SECURITY PROGRAM, DESTINATION OF PAID SHIPMENTS OF CIVIL AIRCRAFT, ENGINES, AND PARTS, APRIL 3, 1948—MARCH 31, 1953
(Millions of dollars)

Destination	Amount	Destination	Amount
TOTAL	$97.3		
France	$55.0	Denmark	$.8
Netherlands	30.6	Greece	.7
Italy	4.6	Indo-China[a]	.3
Belgium-Luxembourg	4.2	Sweden	.1
Norway	1.0		

[a] June 5, 1950 to March 31, 1953.
Source: Mutual Security Agency, "Paid Shipments," SR 26, pp. 11, 27.

TABLE 8–11. MUTUAL SECURITY PROGRAM, SHIPMENTS OF MILITARY AIRCRAFT OCTOBER 6, 1949—APRIL 30, 1953

Period	Total Aircraft Shipped	Air Force Aircraft	Navy Aircraft
TOTAL	3,907[a]	3,271[a]	636[a]
October 6, 1949—March 31, 1950	28	N.A.	N.A.
April 1, 1950—September 30, 1950	223	N.A.	N.A.
October 1, 1950—March 31, 1951	474	N.A.	N.A.
April 1, 1951—September 30, 1951	376	818[b]	283[b]
October 1, 1951—March 31, 1952	656	512	144
April 1, 1952—September 30, 1952	661	612	49
October 1, 1952—March 31, 1953	1,366	1,202	164
April 1, 1953—April 30, 1953	230	227	3

N.A.—Not available.
[a] Revised. Since revision of previously reported monthly shipments is not available "Total" does not agree with total shipments reported above.
[b] Total shipments October 6, 1949 to September 30, 1951.
Source: Department of Defense, Office of Military Assistance, "Department of Defense Key MDAP Statistics" (Monthly).

CHAPTER IX

FOREIGN AVIATION DATA

Manufacturing

The United States aircraft industry currently is producing more aircraft per year than any other nation, with the possible exception of the Soviet Union.

Although few facts about aircraft facilities and production in Iron Curtain countries are available, United States military observers have reported that the Soviet Union has a large and competent aircraft industry. Its production is believed to be numerically as great, or possibly greater, than that of the United States.

Reliable statistics on aircraft production even in the free world are difficult to obtain. The United Kingdom, however, with an aircraft industry employment of more than 200,000, is generally believed to be the world's third-ranking aircraft producer.

Canada, France, Italy, The Netherlands and Sweden have sizeable aircraft industries, and smaller industries exist in Argentina, Australia, and Belgium. Other aircraft-producing nations in the free world include Brazil, Chile, Denmark, Finland, India, Norway, Portugal, Spain, Switzerland and Turkey.

Exports

United States civil aeronautical exports are the world's largest (see Chapter VIII). With the possible exception of the Soviet Union's exports to satellite nations, on which no statistics are available, the only other nations with significant export volume are the United Kingdom and Canada.

Utility Aviation

The development of so-called utility aviation in foreign nations has not been so spectacular as in the United States. While light aircraft are flown for utility purposes in most of the nations of the world, the number of such craft is not substantial. In England, for example, less than 1,000 airplanes fly for charter, private and business use, training, crop-spraying, and other utilitarian purposes. Approximately the same number of utility planes are in operation in Canada. Smaller numbers operate in the countries of continental Europe and Latin America.

International Air Transport

In 1952, the scheduled airlines of the world flew slightly more than a billion miles, carrying 45 million passengers more than 24½ billion passenger-miles.

This traffic volume represents an increase of more than five times as many miles flown, 17 times as many passengers carried, and 28 times as many passenger-miles as in the year 1937.

Freedom of the Air

Today, although freedom of the air space above the high seas is generally accepted, all nations have complete sovereignty over air space above their own territory. They may exclude or admit foreign aircraft on such terms as they see fit.

Despite these barriers to the free use of air space, however, the years from 1919 to the outbreak of World War II in 1939 constituted a great pioneering period in the development of air commerce. By 1939, practically every international air route of importance had been pioneered. The world's air routes were in operation and international air commerce had become reality.

International Agreements

Agreements between nations were essential to the growth of air commerce. The first international air navigation agreement was signed in 1913 between France and Germany. Six years later, the first general air convention took place in Paris with 26 nations represented. In 1928, 11 American countries, which had not signed the Paris Convention in 1919, met and ratified the Habana Convention. Both the Paris and Habana agreements covered safety and technical matters, but neither provided for the establishment of commercial air routes.

Not until the Chicago Conference of 1944 was an international aviation assembly able to resolve more than technical questions. The International Civil Aviation Organization, with headquarters in Montreal, was established as a result of this meeting. ICAO's activities deal not only with technical but also with the economic, legal and some financial aspects of the orderly growth of civil aviation throughout the world.

The International Air Transport Association, an organization of international air carriers, works closely with ICAO and provides an agency for collaboration among international air transport enterprises.

TABLE 9–1. DEVELOPMENT OF WORLD CIVIL AIR TRANSPORT
(Scheduled Services—International and Domestic)
(Excluding China and USSR)
1929–1952

Year	Miles Flown (millions)	Passengers Carried (millions)	Passenger-Miles (millions)	Cargo Ton-Miles (millions)	Mail Ton-Miles (millions)	Average No. of Passengers Per Aircraft	Average Miles Flown Per Passenger
1929	57	N.A.	132	N.A.	N.A.	2.3	N.A.
1930	73	N.A.	180	N.A.	N.A.	2.4	N.A.
1931	85	N.A.	206	N.A.	N.A.	2.4	N.A.
1932	86	N.A.	251	N.A.	N.A.	2.9	N.A.
1933	96	N.A.	337	N.A.	N.A.	3.5	N.A.
1934	101	N.A.	405	N.A.	N.A.	4.0	N.A.
1935	125	N.A.	606	N.A	N.A.	4.9	N.A.
1936	144	N.A.	795	N.A.	N.A.	5.5	N.A.
1937	165	2.5	876	N.A.	N.A.	5.3	350
1938	186	N.A.	1,048	N.A.	N.A.	5.6	N.A.
1939	185	N.A.	1,262	N.A.	N.A.	6.8	N.A.
1940	186	N.A.	1,572	N.A.	N.A.	8.5	N.A.
1941	211	N.A.	2,037	N.A.	N.A.	9.6	N.A.
1942	196	N.A.	2,183	N.A.	N.A.	11.1	N.A.
1943	198	N.A.	2,589	N.A.	N.A.	13.1	N.A.
1944	257	N.A.	3,412	N.A.	N.A.	13.3	N.A.
1945	373	N.A.	5,108	N.A.	N.A.	13.7	N.A.
1946	585	N.A.	9,601	N.A.	N.A.	16.4	N.A.
1947	708	21.0	11,744	187	88	16.6	559
1948	789	23.5	12,987	286	114	16.5	552
1949	836	26.5	14,478	390	128	17.3	546
1950	890	31.2	16,963	518	143	19.1	544
1951	976	39.9	21,375	612	160	21.9	536
1952	1,059	45.0	24,544	651	175	23.2	547

N.A.—Not available.

Source: International Civil Aviation Organization, "Scheduled Airline Operations, Digest of Statistics, No. 36," Series T–No. 9, p. II, III. Revised by ICAO, letter of July 14, 1953.

TABLE 9-2. REVENUE TRAFFIC OF SCHEDULED INTERNATIONAL AND DOMESTIC AIRLINES. SELECTED COUNTRIES.
1932, 1937, 1947, 1951

Country and Year	Aircraft Miles (thousands)	Passenger-Miles (thousands)	Cargo Ton-Miles (thousands)	Mail Ton-Miles (thousands)
ARGENTINA				
1932	N.A.	N.A.	N.A.	N.A.
1937	205	N.A.	N.A.	N.A.
1947	6,225	55,116	N.A.	N.A.
1951[E]	9,196	180,818	N.A.	N.A.
AUSTRALIA				
1932	905	3,396	N.A.	N.A.
1937	6,805	23,869	N.A.	N.A.
1947	33,768	505,873	11,267	3,113
1951	51,531	931,265	9,951	7,034
BELGIUM				
1932	847	2,078	65	29
1937	1,687	8,983	157	92
1947	7,747	133,464	2,300	590
1951	9,391	172,266	6,573	1,561
BRAZIL				
1932	1,061	N.A.	N.A.	N.A.
1937	2,890	19,347	423	149
1947	29,184	351,817	16,022	614
1951	51,958	763,129	43,861	1,204
CANADA				
1932	4,569	2,869	N.A.	N.A.
1937	9,290	10,765	1,873	95
1947	22,233	258,179	2,189	1,826
1951	32,719	646,260	7,195	4,981
FRANCE				
1932	5,903	13,944	421	310
1937	7,758	37,283	567	676
1947	20,535	365,271	6,833	4,867
1951	30,013	784,731	25,568	11,022
INDIA				
1932	107	N.A.	N.A.	N.A.
1937	532	198	1	59
1947	9,360	138,801	1,686	558
1951	19,493	257,188	15,015	3,098

TABLE 9-2. REVENUE TRAFFIC OF SCHEDULED INTERNATIONAL AND DOMESTIC AIRLINES, SELECTED COUNTRIES
1932, 1937, 1947, 1951—*Continued*

Country and Year	Aircraft Miles (thousands)	Passenger-Miles (thousands)	Cargo Ton-Miles (thousands)	Mail Ton-Miles (thousands)
MEXICO				
1932	1,596	5,433	N.A.	N.A.
1937	3,492	16,218	N.A.	N.A.
1947	21,437	309,998	N.A.	N.A.
1951	N.A.	540,472	N.A.	N.A.
NETHERLANDS				
1932	1,983	4,392	193	297
1937	5,275	28,635	554	965
1947	16,647	293,842	5,455	5,643
1951	23,218	544,508	19,337	4,282
NEW ZEALAND				
1932	N.A.	N.A.	N.A.	N.A.
1937	1,194	4,607	3	16
1947	4,207	57,029	557	328
1951	7,199	135,498	4,621	706
PHILIPPINE REPUBLIC				
1932	142	N.A.	N.A.	N.A.
1937	998	1,699	N.A.	N.A.
1947	8,500	97,497	3,525	358
1951	7,159	130,230	5,953	568
SWEDEN				
1932	255	1,209	44	22
1937	1,461	7,342	237	175
1947	6,582	92,911	1,727	525
1951	7,322	160,540	4,519	1,244
SWITZERLAND				
1932	557	2,380	31	16
1937	1,007	7,092	73	49
1947	2,124	33,433	427	155
1951	6,485	122,509	2,424	842
UNION OF SOUTH AFRICA				
1932	149	255	2	4
1937	1,110	5,350	106	210
1947	5,348	71,466	351	1,137
1951	6,482	136,575	1,421	2,116

TABLE 9-2. REVENUE TRAFFIC OF SCHEDULED INTERNATIONAL AND DOMESTIC AIRLINES, SELECTED COUNTRIES.
1932, 1937, 1947, 1951—*Continued*

Country and Year	Aircraft Miles (thousands)	Passenger-Miles (thousands)	Cargo Ton-Miles (thousands)	Mail Ton-Miles (thousands)
UNITED KINGDOM				
1932	1,793	16,007	283	310
1937	10,578	49,489	895	4,317
1947	39,522	441,138	11,425	9,229
1951	53,662	1,075,576	31,403	17,398
UNITED STATES				
1932	51,172	148,187	N.A.	N.A.
1937	74,700	465,287	2,162	6,698
1947	411,527	7,913,970	110,272	48,590
1951	520,574	13,160,952	302,422	90,806
VENEZUELA				
1932	N.A.	N.A.	N.A.	N.A.
1937	213	N.A.	N.A.	N.A.
1947	6,527	N.A.	N.A.	N.A.
1951[E]	15,534	N.A.	N.A.	N.A.

Note: Converted from kilometers to miles by Aircraft Industries Association.
N.A.—Not available.
[E]—Estimate.
Sources: United Nations, "Statistical Yearbook, 1952," pp. 310-315.
International Civil Aviation Organization "Digest of Statistics, No. 36," Series T-No. 9, pp. 2-9.

TABLE 9-3. DEVELOPMENT OF WORLD AIRLINES
1919-1952

Year	Million Plane-Miles Flown
1919	1
1925	13
1930	69
1935	149
1940	186
1945	373
1950	890
1952	1,059

Sources: 1919-1935: H. M. Stationery Office, "The Civil Aviation Statistical and Technical Review, 1938", p. 52: Figures include estimates for China and USSR.
1940-1952: International Civil Aviation Organization, "Scheduled Airline Operations, Digest of Statistics, No. 36", Series T-No. 9, pp. II & III. Figures exclude estimates for China and USSR. Revised by ICAO, Letter of July 14, 1953.

TABLE 9-4. UNITED KINGDOM: AERONAUTIC EXPORTS
1924-1952

Year	TOTAL VALUE (Million Dollars)[a]	Complete Aircraft (includes engines)		Engines		Spare Parts (except magnetos) Value (Million Dollars)[a]
		Number	Value (Million Dollars)[a]	Number	Value (Million Dollars)[a]	
1924	$ 5.3	188	$ 1.9	N.A.	$ 2.0	$ 1.4
1925	5.5	148	1.7	N.A.	2.1	1.7
1926	5.4	150	1.9	N.A.	1.4	2.1
1927	5.3	140	1.0	N.A.	1.9	2.4
1928	6.5	358	2.2	N.A.	1.7	2.6
1929	10.5	525	3.9	N.A.	2.5	4.1
1930	9.9	317	2.9	N.A.	2.6	4.4
1931	8.4	307	3.5	N.A.	1.9	3.0
1932	6.1	300	2.3	N.A.	1.6	2.2
1933	6.5	234	2.0	N.A.	2.2	2.3
1934	9.7	298	3.8	N.A.	3.0	2.9
1935	13.3	453	5.9	N.A.	3.4	4.0
1936	14.5	448	6.4	N.A.	3.7	4.4
1937	17.6	507	9.5	N.A.	2.5	5.6
1938	26.5	506	12.0	N.A.	5.6	8.9
1939	25.4	481	11.1	N.A.	5.3	9.0
1940	40.1	934	22.2	1,027	6.2	11.7
1941	90.5	2,045	56.3	1,529	9.5	24.7
1942	6.8	33	1.3	251	.5	5.0
1943	6.8	9	.4	122	1.1	5.3
1944	12.7	4	.1	672	9.1	3.6
1945	11.5	17	.6	458	5.4	5.5
1946	58.9	1,409	25.9	870	7.6	25.4
1947	100.6	1,730	55.5	1,630	16.3	28.8
1948	104.0	1,123	57.7	1,363	13.0	33.3
1949	125.2[b]	1,248[c]	73.5[c]	1,674[c]	18.4[c]	33.3[b], [c]
1950	95.2[b]	852[c]	39.4[c]	1,708[c]	14.7[c]	41.1[b], [c]
1951	116.5[b]	N.A.	N.A.	N.A.	N.A.	N.A.
1952	121.6[b]	N.A.	N.A.	N.A.	N.A.	N.A.

N.A.—Not available.

[a] Conversion from foreign currency to dollars by Aircraft Industries Association.

[b] Excluding rubber tires and tubes.

[c] Preliminary figures; final data not available.

Sources: H. M. Stationery Office, "The Civil Aviation Statistical and Technical Review, 1938" (1939) p. 45.

Bureau of Foreign and Domestic Commerce, International Trade Unit, from "Annual Statement of the Trade of the United Kingdom." Volume III, 1939.

British Embassy, letter of April 27, 1953.

TABLE 9–5. UNITED KINGDOM: DELIVERIES OF MILITARY AIRCRAFT 1939–1944

Year	Total New Aircraft	Heavy Bombers	Medium and Light Bombers	Fighters	Naval	Trainers	General Reconnaisance, Transport, Air-sea Rescue and Other
1939[a]	2,924	—	1,072	447	165	772	468
1940	15,049	41	3,679	4,283	476	5,125	1,445
1941	20,093	498	4,170	7,063	1,232	6,614	516
1942	23,671	1,976	4,277	9,850	1,082	5,940	546
1943	26,263	4,614	3,113	10,727	1,720	4,825	1,264
1944[b]	14,609	2,889	1,391	5,655	1,533	2,070	1,071
1939–1944[c]	102,609	10,018	17,702	38,025	6,208	25,346	5,310

[a] September–December only.
[b] January–June only.
[c] Total September, 1939–June, 1944.
Source: H. M. Stationery Office, "Statistics Relating to the War Effort of the United Kingdom," November 1944, Cmd 6564, p. 14.

TABLE 9–6. AUSTRALIA: IMPORTS OF AIRCRAFT AND AIRCRAFT ENGINES 1938–1951

Year[a]	Value of Imports (Millions of U. S. Dollars)		Value of Imports from the United States (Millions of U. S. Dollars)	
	Aircraft and Parts	Aircraft Engines and Parts	Aircraft and Parts	Aircraft Engines and Parts
1938	$ 3.4	$ .3	$ 1.5	$ .1
1939	4.6	.6	1.2	.1
1940–1945	N.A.	N.A.	N.A.	N.A.
1946	29.6	6.9	17.1	2.6
1947	6.5	2.7	4.7	.7
1948	5.0	2.1	2.8	1.3
1949	11.0	1.8	8.0	1.3
1950	4.2	1.3	2.6	1.0
1951	3.6	2.1	1.3	.2

N.A.—Not available.
[a] Year ending June 30.
Sources: U. S. Department of Commerce, "Foreign Commerce Yearbook." (Annually)
Government of Australia, Commonwealth Bureau of Census and Statistics, "Oversea Trade and Customs and Excise Revenue." 1951.

TABLE 9-7. UNITED KINGDOM: REGISTERED CIVIL AIRCRAFT 1920–1952

Year	TOTAL REGISTERED (as of December 31)	Number of Registered Aircraft Certified Airworthy
1920	325	149
1925	201	104
1930	846	615
1935	1,535	1,108
1936	1,682	1,210
1937	1,660	1,170
1938	1,666	1,223
1946	1,733	1,033
1947	2,423	1,418
1948	2,433	1,430
1949	2,460	1,555
1950	2,325	1,467
1951	2,158	1,237
1952	1,947	1,196

Source: 1920–1938: H. M. Stationery Office, "The Civil Aviation Statistical and Technical Review," 1938.
1946–1949: Report of the Ministry of Civil Aviation.
1950–1952: Ministry of Civil Aviation, unpublished data.

TABLE 9-8. CANADA: AIRCRAFT AND PARTS INDUSTRY
1935-1951

Year	Number of Plants	Average Number of Employees	Gross Selling Value of Products[a] (Millions of U. S. Dollars)
1935	7	294	$ .9
1936	7	416	1.3
1937	8	606	1.7
1938	13	1,617	6.9
1939	13	3,596	12.6
1940	19	10,348	24.2
1941	24	26,661	74.0
1942	42	44,886	137.8
1943	45	69,529	223.7
1944	45	79,572	388.2
1945	38	37,812	253.3
1946	16	11,405	36.2
1947	12	9,374	44.3
1948	11	8,049	45.6
1949	14	10,695	59.7
1950	15	10,549	50.2
1951	23	19,198	111.3

[a] Conversion from foreign currency to dollars by Aircraft Industries Association.

Source: Air Industries and Transport Association of Canada, "18th Annual Report and Directory," September 30, 1952, p. 16.

TABLE 9-9. CANADA: IMPORTS AND EXPORTS OF AIRCRAFT AND ENGINES[a] 1937–1952

Year	All Imports				All Exports of Aircraft and Parts[b], Value (Millions of U. S. Dollars)
	Aircraft and Parts		Engines and Parts		
	Number of Complete Aircraft	Value of Aircraft and Parts (Millions of U. S. Dollars)	Number of Complete Engines	Value of Engines and Parts (Millions of U. S. Dollars)	
1937	77	$ 1.4[c]	N.A.	$ 1.2[c]	$ .3[c]
1938	48	2.9[c]	N.A.	1.8[c]	2.8[c]
1941	244	21.9[c]	1,741	15.2[c]	18.4[c]
1942	28	32.7[c]	688	7.9[c]	24.5[c]
1943	148	60.5[c]	769	14.9[c]	40.7[c]
1944	40	59.2[c]	1,148	16.5[c]	97.4[c]
1945	23	14.5[c]	95	.6[c]	98.4[c]
1946	332	9.0	778	2.3[d]	9.1
1947	406	12.3	391	5.8	5.9
1948	139	7.9	220	5.2	11.3
1949	99	13.0	319	9.5	24.3
1950	115	10.1	605	7.3	4.0
1951	244	39.4[c]	849	18.6[c]	7.1[c]
1952	461	90.5[c]	2,214	64.0[c]	35.6[c]

N.A.—Not available.
[a] For consumption.
[b] Excludes re-exports.
[c] Conversion from foreign currency to dollars by Aircraft Industries Association.
[d] The figure given by the Dominion Bureau of Statistics is $1,485,395.
Sources: Dominion Bureau of Statistics, "The Aircraft Industry." (Annually)
U. S. Department of Commerce, "The Foreign Commerce Yearbook." (Annually)
Government of Canada, "Trade of Canada," Imports and Exports, 1951, 1952.

TABLE 9-10. CANADA: IMPORTS FROM THE UNITED STATES AND EXPORTS TO THE UNITED STATES
1937-1952

Year	Imports[a]				Exports of Aircraft and Parts, Value (Millions of U. S. Dollars)
	Number of Complete Aircraft	Value of Aircraft and Parts (Millions of U. S. Dollars)	Number of Complete Engines	Value of Engines and Parts (Millions of U. S. Dollars)	
1937	59	$ 1.0	N.A.	$ .8	$ .025
1938	48	2.2	N.A.	.9	.012
1946	328	8.5	N.A.	1.2	1.7
1947	400	11.7	509	1.3	.8
1948	138	7.2	156	.8	4.5
1949	99	10.5	133	1.1	3.1
1950	113	8.4	478	3.1	2.2
1951	254	28.6[b]	716	13.6[b]	9.7[b]
1952	444	73.3[b]	2,074	57.0[b]	32.7[b]

N.A.—Not available.
[a] For consumption.
[b] Conversion from foreign currency to dollars by Aircraft Industries Association.
Sources: U. S. Department of Commerce, "Foreign Commerce Yearbook." (Annually)
Government of Canada, "Trade of Canada," Imports and Exports, 1951, 1952.

TABLE 9-11. CANADA: AIRCRAFT, AIRPORT AND PERSONNEL LICENSES
1952

Airports licensed	414
Aircraft licensed—private	925
Aircraft licensed—commercial	1,244
Aircraft licensed—state	131
Pilot Licenses—private	4,497
Pilot Licenses—commercial	965
Pilot Licenses—old commercial	40
Pilot Licenses—senior commercial	176
Pilot Licenses—transport (old)	575
Pilot Licenses—air line transport	212
Air traffic controller, licenses	168
Air Engineer Licenses (old)	397
—"M" Licenses	1,010
Air Navigators	33

Source: Air Industries and Transport Association of Canada, "18th Annual Report and Directory" September 30, 1952, p. 15.

TABLE 9-12. FRANCE: IMPORTS AND EXPORTS OF AIRCRAFT AND PARTS[a] 1937-1951

Year	Total Imports		Total Exports		Imports from United States	
	Weight (Millions of Pounds)	Value[b] (Millions of U. S. Dollars)	Weight (Millions of Pounds)	Value[b] (Millions of U. S. Dollars)	Weight (Millions of Pounds)	Value[b] (Millions of U. S. Dollars)
1937	1.4	$ 4.3	1.4	$ 3.0	N.A.	N.A.
1938	1.2	3.8	1.2	3.7	N.A.	N.A.
1939	1.0	3.5	1.3	.5	1.9	$ 1.9
1940	4.0	25.6	.7	1.5	3.3	22.1
1941	.2	.6	.1	.3	—	.05
1942	.4	1.5	1.2	.7	—	.6
1943	1.9	6.8	15.4	72.4	—	—
1944	3.8	5.6	11.2	65.6	—	—
1945	.8	1.3	.05	.2	—	—
1946	17.4	22.7	.4	1.1	1.1	3.5
1947	4.0	7.5	.6	2.7	1.5	4.4
1948	1.5	6.3	.5	1.2	.8	4.3
1949	1.0	5.4	.2	.8	.8	3.4
1950	2.9	21.0	.3	1.0	1.8	16.9
1951	1.3	9.5	1.4	2.0	.8	7.9

[a] Including France Overseas.

[b] Conversion from foreign currency to dollars by Aircraft Industries Association.

Sources: U. S. Department of Commerce, "Foreign Commerce Yearbook." (Annually)
Government of France, Direction Generale des Douanes et Droits Indirects, "Tableau General du Commerce Exterior." (Annually)

TABLE 9-13. NETHERLANDS: IMPORTS AND EXPORTS OF AIRCRAFT AND PARTS 1937–1952

Year	Total Imports (Millions of U. S. Dollars)	Total Exports (Millions of U. S. Dollars)	Imports from United States (Millions of U. S. Dollars)
1937	$ 1.8[a]	$ 1.8	$ 1.6[a]
1938	1.9[a]	.7	1.1[a]
1939	2.6[a]	2.8	1.9[a]
1940	1.1[a]	1.1	.7[a]
1941	.1[a]	[b]	—
1942	[b]	[b]	—
1943	[b]	[b]	—
1944	N.A.	N.A.	N.A.
1945	N.A.	N.A.	N.A.
1946	5.5[a]	.3	4.8[a]
1947	15.7	3.5	7.3[a]
1948	28.8	3.2	25.9[c]
1949	21.1	6.6	13.4[c]
1950	21.5	6.1	10.3[c]
1951	11.6[c]	4.2[c]	4.2[c]
1952	20.1[c]	7.3[c]	12.3[c]

N.A.—Not available.

[a] Imports for consumption, excluding motors.

[b] Less than $500,000.

[c] Conversion from foreign currency to dollars by Aircraft Industries Association.

Sources: U. S. Department of Commerce, "Foreign Commerce Yearbook" (Annually).

Netherlands Official Statistics, Published by the Central Bureau of Statistics; 1939–1943, "Jaarstatistiek Van Den In-, Vit-En Doorvoer": 1946–1952 (December) "Naandstatistiek Van Den In-, Vit-En Doorvoier Per Goederensoort."

CHAPTER X

AIR TRAFFIC FACILITIES

Although accurate figures on the investment in U. S. airports have not been maintained, best estimates place the acquisition cost of the more than 6,000 civil airports in the nation at about four billion dollars.

An additional approximate six billion dollars has been spent for acquisition of military airports.

Growth of the Nation's Airports

Until 1927, nearly all airports and landing fields in the nation were provided by the government for its air mail service (See Chapter VI).

The rapid expansion of aviation activity following Lindbergh's flight to Paris in 1927, however, brought profound changes—and a rapid growth in the number of private and municipally-owned airports. Municipal rivalry and competition for airline services helped to encourage airport construction without Federal assistance.

With the depression, and the collapse of private and municipal investments in airports, Federal aid was again instituted in 1933. By the end of World War II, with its increased tempo of air traffic, total Federal expenditures for civil airports aproached 750 million dollars.

In 1946, the continuing need for airport improvements was recognized by the Federal Airport Act of that year, which established a long-term program for Federal airport aid. Less than $200 millions have been spent on the program to date.

Airport Characteristics

As late as the 1920's, 100-acre sod fields with 1,500 feet cinder or gravel runways were sufficient to handle early model slow-landing airplanes.

By 1925, however, transport landing speeds reached about 50 miles per hour, and today they have reached approximately 100 miles per hour, bringing increasing requirements for stronger and longer runways and for larger airports.

As weight and landing speeds continue to rise, stronger and larger runways, taxiways, and aprons will be needed.

Present minimum runway requirements for airplanes with 100-mile-per-hour landing speeds are roughly 6,000 feet. Unless landing and braking characteristics are improved, jet airliners of the future will land

at 120 to 130 miles per hour, and probably will require runways on the order of 8,400 to 10,000 feet.

Federal Airways

A system of aerial highways, known as Federal Airways, today connects all major cities in the United States. More than 72,000 miles of airways are marked with electronic navigational aids (beams, beacons, or modern omni-ranges) designed to transmit signals enabling airplanes to maintain their proper course and to know their positions as they fly.

The Common System

The problems of air navigation center around instrument weather, when pilots must guide their aircraft accurately in three dimensions with nothing visible outside—and must have the ability to leave cruising altitudes and descend at speeds on the order of 140 miles per hour to the runways at the airports of their destination.

Many navigational instruments help make this possible. They include radio ranges (VOR) which tell a pilot where to fly; fan markers, which are like road signs, telling the distance to the destination; and direction finders which relate the bearing of the plane to the known location of a given radio station.

To improve safety and reliability, additional aids are provided through traffic control instructions from communications stations and traffic control centers along air routes. At present, transmission of these instructions requires communication with the ground by two-way radio; in the future, automatic equipment will furnish pilots with these traffic-control instructions.

By 1963, a nationally-integrated system of airways sufficient for the needs of America's air commerce and military aviation is expected to be fully operational. This airways system—called "The Common System"—was developed by a joint group of government and industry experts, and will provide navigational equipment and procedures adequate for the higher-density air traffic expected in future years. It is now in partial operation.

TABLE 10-1. CLASSIFICATION OF AIRPORTS

Class	Size and Weight of Plane	Length of Runway	Community
I	Up to 5 place Up to 4,000 lbs. gross weight	Unpaved 1,800–2,700 feet Paved 1,800–2,500 feet	Small
II	Up to 20 place Up to 15,000 lbs. gross weight	Unpaved 2,700–3,700 feet Paved 2,500–3,500 feet	5,000–25,000
III	Up to 30 place Up to 50,000 lbs. gross weight	Unpaved 3,700–4,700 feet Paved 3,500–4,500 feet	25,000–250,000
IV	Large aircraft 74,000 lbs. gross weight	Unpaved 4,700–5,700 feet Paved 4,500–5,500 feet	Metropolitan Centers & Air Terminals
V	Large aircraft 74,000 lbs. gross weight and over	Unpaved 5,700–6,700 feet Paved 5,500–6,500 feet	Metropolitan Centers & Air Terminals
VI & over	Largest aircraft	Unpaved 6,700 feet & over Paved 6,500 feet & over	Metropolitan Centers & Air Terminals
Sub-Class I	Does not come up to standards of Class I.		

Source: Aircraft Industries Association, "Aviation Facts and Figures, 1945," p. 113; brought up to date from Civil Aeronautics Administration files.

TABLE 10–2. COMMUNITIES AND THEIR AIRPORTS, DECEMBER 31, 1952

Community Size Population	Number of Airports	Class I and Below	Class II	Class III	Class IV and Above	Paved	Unpaved
TOTAL	6,042	3,685	976	571	810	1,498	4,544
0–9,999	4,456	3,104	662	320	370	707	3,749
10,000–49,999	1,034	408	202	188	236	480	554
50,000–249,999	379	115	74	53	137	207	172
250,000 and over	173	58	38	10	67	104	69

Source: Civil Aeronautics Administration; unpublished data.

TABLE 10–3. AIRPORTS BY CLASS AND REGION, DECEMBER 31, 1952

Division	TOTAL	Class Sub I and I	Class II	Class III	Class IV	Class V	Class VI and Over
TOTAL	6,042	3,685	976	571	437	181	192
New England	224	139	24	30	17	5	9
Middle Atlantic	489	344	73	33	26	8	5
East North Central	917	615	183	60	36	9	14
West North Central	884	640	121	47	35	16	25
South Atlantic	704	328	106	94	109	24	43
East South Central	268	150	43	39	26	6	4
West South Central	936	543	173	90	71	34	25
Mountain	835	466	143	109	49	40	28
Pacific	785	460	110	69	68	39	39

Source: Civil Aeronautics Administration; unpublished data. Grouping done by AIA.

TABLE 10–4. CLASSES OF AIRPORTS BY STATES, DECEMBER 31, 1952

State	TOTAL	Class Sub I and I	Class II	Class III	Class IV	Class V	Class VI and over
TOTAL	6,042	3,685	976	571	437	181	192
Alabama	78	36	15	14	10	1	2
Arizona	179	75	43	30	12	14	5
Arkansas	80	51	10	10	9	0	0
California	495	273	78	46	38	32	28
Colorado	107	51	26	22	2	0	6
Connecticut	22	13	1	2	5	1	0
Delaware	19	12	2	2	1	0	2
Dist. of Columbia	3	0	0	0	1	1	1
Florida	175	45	21	39	40	11	19
Georgia	108	40	16	21	22	2	7
Idaho	148	122	14	7	2	0	3
Illinois	169	101	43	12	8	3	2
Indiana	124	80	25	9	8	2	0
Iowa	156	127	14	6	8	0	1
Kansas	184	121	28	13	4	9	9
Kentucky	47	31	5	6	4	0	1
Louisiana	94	54	15	12	7	3	3
Maine	67	42	5	13	2	2	3
Maryland	49	25	10	4	6	0	4
Massachusetts	71	41	12	8	6	0	4
Michigan	247	173	41	15	11	2	5
Minnesota	116	72	32	6	4	1	1
Mississippi	85	48	11	16	8	1	1
Missouri	109	76	15	10	5	2	1
Montana	123	89	15	7	6	2	4
Nebraska	128	96	13	4	2	2	11
Nevada	70	33	7	10	10	9	1
New Hampshire	31	20	5	3	2	0	1
New Jersey	76	50	12	7	5	1	1
New Mexico	98	51	16	7	9	8	7
New York	214	147	32	12	14	6	3
North Carolina	132	79	19	15	12	2	5
North Dakota	122	101	11	2	8	0	0

TABLE 10–4. CLASSES OF AIRPORTS BY STATES, DECEMBER 31, 1952—*Continued*

State	TOTAL	Class Sub I and I	Class II	Class III	Class IV	Class V	Class VI and over
Ohio	217	154	40	10	6	2	5
Oklahoma	145	88	21	13	12	7	4
Oregon	123	81	10	12	14	4	2
Pennsylvania	199	147	29	14	7	1	1
Rhode Island	11	5	1	1	2	2	0
South Carolina	64	28	13	2	13	5	3
South Dakota	69	47	8	6	4	2	2
Tennessee	58	35	12	3	4	4	0
Texas	617	350	127	55	43	24	18
Utah	60	25	13	13	2	6	1
Vermont	22	18	0	3	0	0	1
Virginia	113	73	17	8	11	2	2
Washington	167	106	22	11	16	3	9
West Virginia	41	26	8	3	3	1	0
Wisconsin	160	107	34	14	3	0	2
Wyoming	50	20	9	13	6	1	1

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 9; brought up to date from CAA files.

TABLE 10–5. AIRPORTS BY CLASSIFICATION, 1939–1952

Date	TOTAL	Class Sub I	Class I	Class II	Class III	Class IV	Class V	Class VI & over
Jan. 1, 1939	2,174	—	1,693	424	57	—	—	—
Apr. 1, 1944	2,942	—	981	810	443	403	305	—
July 1, 1944	3,086	256	767	834	464	765		—
Jan. 1, 1945	3,427	330	885	936	464	812		—
Jan. 1, 1948	5,759	1,215	2,366	888	526	444	184	136
Jan. 1, 1951	6,403	1,400	2,642	994	575	452	188	152
Dec. 31, 1951	6,237	1,356	2,515	993	573	453	180	167
Dec. 31, 1952	6,042	1,274	2,411	976	571	437	181	192

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation," 1944, 1945, 1948, 1949, 1950; brought up to date from CAA files.

"National Airport Plan," House Document 807, November 28, 1944, p. 19.

TABLE 10–6. AIRPORTS BY TYPE, 1927–1952

As of Dec. 31	TOTAL	Commercial	Municipal	CAA Intermediate	All Others	Lighted Total
1927	1,036	263	240	134	399[a]	N.A.
1928	1,364	365	368	210	421[a]	N.A.
1929	1,550	495	453	285	317[a]	N.A.
1930	1,782	564	550	354	314[a]	640
1931	2,093	829	780	404	80	680
1932	2,117	869	777	352	119	701
1933	2,188	938	827	265	158	626
1934	2,297	872	980	259	186	664
1935	2,368	822	1,041	291	214	698
1936	2,342	774	1,037	296	235	705
1937	2,299	727	1,053	283	236	720
1938	2,374	760	1,092	267	255	719
1939	2,280	801	963	266	250	735
1940	2,331	860	1,031	289	151	776
1941	2,484	930	1,086	283	185	662
1942	2,809	1,069	1,129	273	338	700
1943	2,769	801	914	240	814	859
1944	3,427	1,027	1,067	229	1,104	964
1945	4,026	1,509	1,220	216	1,081	1,007
1946	4,490	1,930	1,424	201	935	1,019
1947	5,759	2,849	1,818	178	914	1,447
1948	6,414	2,989	2,050	161	1,214	1,521
1949	6,484	2,585	2,200	139	1,560	1,480
1950	6,403	2,329	2,272	76	1,726	1,670
1951	6,237	2,042	2,316	57	1,822	N.A.
1952	6,042	[b]	[b]	[b]	[b]	1,858

N.A. Not available.

[a] Include auxiliary marked fields, later classified as to ownership.

[b] Airports are now classified on a basis not comparable to data in this table.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 6; brought up to date from CAA files.

TABLE 10–7. TYPES OF AIRPORTS BY STATES, DECEMBER 31, 1952

State	TOTAL	Type				
		Municipal	Commercial	Limited	Military	Private
TOTAL	6,042	2,336	1,731	1,231	363	381
Alabama	78	37	18	5	16	2
Arizona	179	59	24	61	31	4
Arkansas	80	34	22	21	0	3
California	495	160	125	105	50	55
Colorado	107	53	30	12	2	10
Connecticut	22	8	11	1	0	2
Delaware	19	2	8	3	1	5
Dist. of Columbia	3	1	0	0	2	0
Florida	175	84	34	4	51	2
Georgia	108	59	10	19	10	10
Idaho	148	69	6	48	1	24
Illinois	169	43	100	19	3	4
Indiana	124	35	74	7	4	4
Iowa	156	58	33	56	2	7
Kansas	184	101	33	27	8	15
Kentucky	47	18	14	8	2	5
Louisiana	94	35	12	34	6	7
Maine	67	24	15	21	4	3
Maryland	49	7	21	8	6	7
Massachusetts	71	23	33	5	5	5
Michigan	247	109	59	64	6	9
Minnesota	116	87	26	0	1	2
Mississippi	85	33	20	20	7	5
Missouri	109	51	38	17	2	1
Montana	123	83	14	19	1	6
Nebraska	128	71	32	21	1	3
Nevada	70	23	12	27	5	3
New Hampshire	31	12	13	2	1	3
New Jersey	76	10	59	4	2	1
New Mexico	98	37	5	42	4	10
New York	214	43	90	66	9	6
North Carolina	132	36	62	18	12	4
North Dakota	122	68	13	41	0	0
Ohio	217	38	132	28	5	14
Oklahoma	145	79	22	30	7	7

TABLE 10–7. TYPES OF AIRPORTS BY STATES, DECEMBER 31, 1952—*Continued*

State	Total	Type				
		Municipal	Commercial	Limited	Military	Private
Oregon	123	52	23	45	1	2
Pennsylvania	199	47	131	14	4	3
Rhode Island	11	4	5	0	2	0
South Carolina	64	38	16	4	5	1
South Dakota	69	50	13	4	1	1
Tennessee	58	25	20	7	3	3
Texas	617	163	104	192	47	111
Utah	60	42	8	5	5	0
Vermont	22	9	9	1	1	2
Virginia	113	28	43	25	14	3
Washington	167	70	38	46	11	2
West Virginia	41	16	20	3	0	2
Wisconsin	160	68	75	14	1	2
Wyoming	50	34	6	8	1	1

Source: Civil Aeronautics Administration; unpublished data.

TABLE 10–8. ESTIMATED INVESTMENT IN CIVIL AIRPORTS, 1926–1952
(Millions of dollars)

Year	Amount of Investment
1926	$ 42
1939	326
1941	419
1945	1,027
1952	4,000[a]

[a] Acquisition cost.

Sources: 1926–1939: Federal Coordinator of Transportation, "Public Aids to Transportation," Vol. 1, p. 153.

1941–1945: Civil Aeronautics Administration, Airports Service; unpublished data.

1952: President's Airport Commission, "The Airport and Its Neighbors," p. 95.

TABLE 10-9. MOTOR-FUEL CONSUMPTION BY CIVIL AIRCRAFT
1926-1951
(Millions of gallons)

Year	TOTAL CONSUMPTION		Domestic Scheduled Air Carriers		U. S. International Scheduled Air Carriers[a]		Other Civil Flying	
	Gasoline	Oil	Gasoline	Oil	Gasoline	Oil	Gasoline	Oil
1926	3.3	.2	.9	.1	—	—	2.4	.1
1927	5.0	.3	1.1	.1	—	—	3.9	.2
1928	9.9	.5	2.1	.1	—	—	7.8	.4
1929	20.5	1.0	5.6	.3	.7	[b]	14.2	.7
1930	28.5	1.2	12.3	.4	2.2	.1	14.0	.7
1931	30.8	1.2	16.3	.6	2.8	.1	11.7	.5
1932	34.0	1.1	19.8	.6	3.9	.1	10.3	.4
1933	35.2	1.3	21.9	.8	4.4	.1	8.9	.4
1934	34.8	1.2	18.9	.7	6.2	.2	9.7	.3
1935	44.4	1.2	27.3	.7	6.0	.2	11.1	.3
1936	47.6	1.2	30.6	.7	6.5	.2	10.5	.3
1937	52.0	1.2	34.0	.7	7.4	.2	10.6	.3
1938	55.5	1.1	37.7	.6	7.6	.2	10.2	.3
1939	72.3	1.4	47.2	.7	8.7	.2	16.4	.5
1940	96.9	1.9	65.7	1.1	8.8	.2	22.4	.6
1941	122.3	2.4	81.7	1.3	11.3	.3E	29.3	.8
1942	110.6	2.0	68.9	1.0	16.8	.3E	24.9	.7
1943	78.8	1.1	65.0	.9	13.8	.2	N.A.	N.A.
1944	105.2	1.5	89.5	1.3	15.7	.2	N.A.	N.A.
1945	159.9	2.0	134.8	1.7	25.1	.3	N.A.	N.A.
1946	394.5	5.8	236.4	2.9	59.5	.8	98.6	2.2
1947	553.6	8.4	294.2	3.7	102.7	1.2	156.7	3.5
1948	635.2	9.5	332.4	4.2	123.4	1.3	179.4	4.0
1949	649.9	9.3	375.3	4.7	142.8	1.7	131.8	2.9
1950	572.2	6.7	418.4	5.0	153.8	1.7	N.A.	N.A.
1951	789.2	10.2	491.5	5.6	165.9	1.7	131.8	2.9

E.—Estimated.
N.A.—Not available.
[a] 1929-31 figures include fuel consumed by territorial operators; in subsequent years fuel consumed by territorial operators is included in the domestic totals.
[b] 35,000 gallons.
Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," pp. 39, 55, 75; brought up to date from CAA files.

TABLE 10–10. AIDS TO AIR NAVIGATION, 1926–1952

Year	Civil Airways Mileage		Radio Range Stations		Non-directional Radio Beacons	Federally Operated Traffic Control Facilities		Interstate Airways Communication Stations
	Controlled Airways	Direct VOR Airways	Low and Medium Frequency	Very High Frequency		Airport Towers	Airway Centers	
1926	2,041	—	—	—	—	—	—	—
1927	4,468	—	—	—	—	—	—	—
1928	6,988	—	—	—	—	—	—	—
1929	12,448	—	9	—	—	—	—	—
1930	15,258	—	33	—	6	—	—	—
1931	17,152	—	47	—	46	—	—	
1932	19,500	—	68	—	74	—	—	—
1933	18,655	—	94	—	77	—	—	—
1934	19,081	—	112	—	73	—	—	205
1935	22,012	—	137	—	57	—	—	206
1936	22,245	—	146	—	57	—	—	203
1937	22,319	—	180	—	55	—	8	245
1938	23,723	—	215	—	50	—	8	286
1939	27,074	—	244	—	44	—	11	321
1940	32,100	—	290	2	48	—	11	365
1941	36,062	—	323	8	48	—	14	415
1942	38,498	—	303	8	40	61	23	430
1943	41,506	—	323	8	63	101	25	408
1944	42,549	—	333	9	84	104	28	439
1945	43,285	—	344	16	88	107	29	438
1946	44,145	—	364	50	74	115	29	397
1947	47,029	—	365	100	81	134	31	403
1948	56,069	—	376	333	98	150	30	437
1949	61,392	—	378	370	120	162	30	464
1950	70,253	—	378	271	141	172	31	451
1951	74,424	—	375	385	152	157	31	427
1952	72,328	45,831	372	388	166	141	31	415

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 19; brought up to date from CAA files.

TABLE 10–11. LANDING AIDS TO AIR NAVIGATION, 1940–1952

Calendar Year	Instrument Landing Systems	Precision Beam Radar	Airport Surveillance Radar
1940	1	—	—
1941	1	—	—
1942	1	—	—
1943	8	—	—
1944	9	—	—
1945	9	—	—
1946	31	—	—
1947	60	4	4
1948	79	3	3
1949	94	3	3
1950	96	7	7
1951	97	10	10
1952	120	10	10

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 21; brought up to date from CAA files.

TABLE 10–12. AIRCRAFT OPERATIONS AT CAA OPERATED AIRPORT TRAFFIC CONTROL TOWERS 1945–1952
(Millions of Operations)

Year	TOTAL	Military	Scheduled Airlines	Other Civil
1945	9.4	4.3	1.6	3.5
1946	11.9	1.4	2.3	8.2
1947	17.7	1.6	2.9	13.2
1948	18.4	2.3	3.2	12.9
1949	16.9	2.8	3.7	10.4
1950	16.0	2.4	4.0	9.6
1951	17.0	2.9	4.5	9.6
1952	15.8	3.0	4.9	7.9

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950," p. 21; brought up to date from CAA files.

CHAPTER XI

TRAINING

Behind America's aviation leadership are men—men who push back the frontiers of knowledge, and men who apply what has been learned to the design and production of more advanced aircraft. There are engineers, draftsmen and workers. There are highly-skilled crews who fly the nation's commercial and military aircraft. There are skilled technicians who maintain and direct air traffic. There are managers in the aircraft and air transport industries, in the military, and in the civil services of the government who plan and guide America's gigantic aviation effort.

Education and training, which assure a constant and highly qualified supply of personnel, are of crucial importance to the maintenance of American aviation leadership.

Military Training

During World War II, more than 160 civilian schools were under Army Air Force contract to train flying and technical personnel. To a lesser degree, the Air Force employed this system of contracting with civilian schools during the early days of the Korean War.

At present, however, the Air Force has discontinued its use of civilian schools for other than primary flying instruction, and as a result most training schools are faced with serious economic problems.

In 1950, pilots were being trained for the Air Force at an annual rate of 3,000. With the advent of the Korean War, this rate was increased to 4,000 per year, then to 7,200 per year—and in 1952 and 1953, increases to 10,000 and 12,000 were under consideration.

Security restrictions prevent disclosure of the current rate at which military pilots are being produced; however, the demand for trainees exceeds the supply of qualified applicants.

Industry and Airline Training Programs

The aircraft manufacturing industry, which has been repeatedly faced with shortages of skilled personnel, undertakes apprentice and in-plant training programs during most periods of emergency expansion. In addition, a number of companies have programs under which they underwrite all, or a portion of, the tuition costs for personnel attending outside technical schools and colleges.

The nation's airlines operate flight and ground schools for the orientation and training of new employees, and for maintaining a high level of personnel efficiency.

TABLE 11-1. CIVIL FLYING SCHOOLS, STUDENTS AND CERTIFICATED PILOTS 1927-1952

Year	Certified Civil Flying Schools[a]	Student Pilot Certificates Issued As of December 31	Number of Certificated Airplane Pilots As of December 31
1927	—	545	1,572
1928	—	9,717	4,887
1929	24	20,400	10,287
1930	39	18,398	15,280
1931	29	16,061	17,739
1932	21	11,325	18,594
1933	19	12,752	13,960
1934	21	11,994	13,949
1935	24	14,572	14,805
1936	27	17,675	15,952
1937	30	21,770	17,681
1938	24	15,556	22,983
1939	46	29,839	33,706
1940	749	110,938	69,829
1941	1,054	93,366	129,947
1942	843	93,777	166,626
1943	693	36,802	173,206
1944	N.A.	51,618	183,383
1945	964	77,188	296,895
1946	1,557	173,432	400,061
1947	3,078	192,924	433,241[b]
1948	3,058	117,725	491,306[c]
1949	2,430	49,575	525,174
1950	2,086	44,591	N.A.
1951	1,625	45,003	580,574
1952	1,280	30,537	N.A.

N.A.—Not available.

[a] At different dates during the year.

[b] As of April 1, 1948.

[c] As of May 1, 1949.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950" p. brought up to date from CAA files.

TABLE 11–2. CAA-APPROVED FLIGHT AND GROUND SCHOOLS
December 31, 1952

State	TOTAL	Combined Flight and Ground	Flight Only	Ground Only
TOTAL	1,280	417	803	60
Alabama	12	—	12	—
Arizona	13	8	5	—
Arkansas	25	6	19	—
California	114	59	37	18
Colorado	25	3	21	1
Connecticut	10	9	1	—
Delaware	3	1	2	—
District of Columbia	1	—	—	1
Florida	43	27	9	7
Georgia	14	9	5	—
Idaho	25	1	24	—
Illinois	31	12	18	1
Indiana	26	6	20	—
Iowa	50	2	47	1
Kansas	35	—	34	1
Kentucky	13	1	12	—
Louisiana	17	1	16	—
Maine	13	6	7	—
Maryland	11	—	10	1
Massachusetts	41	19	21	1
Michigan	24	4	20	—
Minnesota	20	2	18	—
Mississippi	4	3	1	—
Missouri	33	13	17	3
Montana	5	—	5	—
Nebraska	35	2	33	—
Nevada	5	—	5	—
New Hampshire	10	9	1	—
New Jersey	40	15	25	—
New Mexico	4	—	4	—
New York	64	42	17	5
North Carolina	24	16	7	1
North Dakota	8	1	6	1
Ohio	60	12	47	1
Oklahoma	25	2	23	—

TABLE 11–2. CAA-APPROVED FLIGHT AND GROUND SCHOOLS
December 31, 1952—*Continued*

State	TOTAL	Combined Flight and Ground	Flight Only	Ground Only
Oregon	28	1	26	1
Pennsylvania	99	9	88	2
Rhode Island	6	3	3	—
South Carolina	15	11	4	—
South Dakota	20	17	2	1
Tennessee	16	2	14	—
Texas	84	60	15	9
Utah	18	1	17	—
Vermont	5	3	2	—
Virginia	27	1	26	—
Washington	39	14	21	4
West Virginia	14	1	13	—
Wisconsin	15	2	13	—
Wyoming	10	—	10	—
Outside Continental U. S.	1	1	—	—

Source: Civil Aeronautics Administration, unpublished data.

TABLE 11–3. CIVIL PILOT AND OTHER RATINGS CERTIFICATES ISSUED
January 1952–June 1953

Type of Certificate	Jan–June 1952	July–Dec 1952	Jan–June 1953
Pilot Ratings			
Student	13,384	17,153	16,521
Private	7,518	7,713	5,256
Commercial	2,219	2,039	1,343
Air Transport	449	340	354
Flight Instructor	618	464	476
Instrument	1,497	948	1,046
Other Ratings			
Mechanic[a]	2,376	2,482	3,061
Navigator	90	30	26
Radio Operator	84	7	6

[a] Original and additional ratings.
Source: Civil Aeronautics Administration records.

TABLE 11–4. INVENTORY OF CIVIL AVIATION SKILLS
1927–1952

As of December 31	Certificated Airplane Pilots				Glider Pilots	Mechanics	Parachute Riggers	Ground Instructors
	TOTAL	Airline Transport	Commercial	Private				
1927	1,572	[a]	N.A.	N.A.	.....	.....	.....	.....
1928	4,887	[a]	N.A.	N.A.	.....	4,383	.....	.....
1929	10,287	[a]	6,053	4,162	.....	7,701	.....	154
1930	15,280	[a]	7,847	7,433	178	8,950	93	269
1931	17,739	[a]	8,513	9,226	267	9,016	224	138
1932	18,594	330	7,967	10,297	209	8,373	305	86
1933	13,960	554	7,635	5,771	149	8,226	335	63
1934	13,949	676	7,484	5,789	109	8,156	358	59
1935	14,805	736	7,362	6,707	145	8,432	381	55
1936	15,952	842	7,288	7,822	138	8,738	393	48
1937	17,681	1,064	6,411	10,206	161	9,314	362	55
1938	22,983	1,159	7,839	13,985	172	9,884	397	92
1939	33,706	1,197	11,677	20,832	170	10,296	425	446
1940	69,829	1,431	18,791	49,607	138	11,177	444	1,948
1941	129,947	1,587	34,578	93,782	160	14,047	618	4,815
1942	166,626	2,177	55,760	108,689	211	18,097	1,004	7,604
1943	173,206	2,315	63,940	106,951	1,435	20,805	1,637[b]	12,739
1944	183,383	3,046	68,449	111,888	2,412	23,157	939	14,647
1945	296,895	5,815	162,873	128,207	2,438	27,272	1,029	15,195
1946	400,061	7,654	203,251	189,156	N.A.	N.A.	N.A.	N.A.
1947[c]	433,241	7,059	181,912	244,270	2,995	51,102	1,643	21,487
1948[d]	491,306	7,762	176,845	306,699	3,143	60,420	1,805	23,174
1949	525,174	9,025	187,769	328,380	3,291	64,736	1,935	24,257
1950	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
1951	580,574	10,813	197,900	371,861	3,300	73,964	2,089	25,803
1952[e]	573,956	10,898	191,524	371,174	3,324	75,493	2,092	25,892

N.A.—Not available.

[a] Airline Transport Rating became effective May 5, 1932.

[b] Includes 473 parachute technicians.

[c] As of April 1, 1948.

[d] As of May 1, 1949.

[e] As of July 1, 1952.

Source: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950", p. 25. Brought up to date from CAA files.

TABLE 11–5. ANNUAL TRAINING OUTPUT NAVY AND MARINE PILOTS 1949–1953

Fiscal Year	Number
1949	688
1950	1,691
1951	1,288
1952	932
1953	1,701

Source: Bureau of Aeronautics letter of September 1, 1953.

TABLE 11–6. TRAINING OF FOREIGN NATIONALS UNDER GRANT AID PROGRAMS BY THE AIR FORCE as of March 31, 1953

Type of Training	TOTAL	In U. S.	Overseas
Formal Training[a]			
Completed Training	7,665	6,407	1,258
Currently Training	3,368	3,244	124
Orientation Visits[b]			
Completed	217	83	134
Current	1	1	—
Mobile Training Teams[c]			
Completed Training	69	—	69
Currently Training	47	—	47
Technical Representatives[d]			
Completed Training	90	—	90
Currently Training	89	—	89

[a] Number of Military Defense Assistance Program Training courses.

[b] Number of Foreign Nationals who visit installations of the U. S. Air Force.

[c] Number of training teams composed of USAF instructor and technical personnel organized to provide training, instruction, guidance, or assistance on specialized or complicated equipment.

[d] Number of contract civilian technical specialists.

Source: Office of the Secretary of Defense, Office of Military Assistance, "MDAP—Mutua Defense Assistance Program," May 6, 1953, p. 45.

TABLE 11–7. ESTIMATED NUMBER OF ENGINEERING GRADUATES IN THE UNITED STATES AND THE SOVIET UNION
1940–1955

Year	United States	Soviet Union
1940	14,000	30,000
1941	13,000	26,500
1942	N.A.	14,000
1943	14,000	9,000
1944	14,000	9,000
1945	4,000	10,000
1946	7,000	11,500
1947	19,000	17,000
1948	31,000	20,000
1949	47,000	25,000
1950	52,000	28,500
1951	42,000	29,500
1952	30,000	30,000
1953	24,000	32,000
1954	19,000	35,000
1955	23,000	40,000

Sources: United States: U. S. Department of Health, Education and Welfare, Office of Education.
Soviet Union: Plotted from chart in "The Second Annual Report of the National Science Foundation, Fiscal Year 1952," p. 26.

CHAPTER XII

RESEARCH AND DEVELOPMENT

The airplane of today and the airplane or the guided missile of tomorrow are the end products of the interplay of many forces and pursuits—scientists exploring the unknown, engineers using the findings of the scientists in solving practical problems, military experts defining the minimum performance of a plane that does not yet exist, purchasing departments ordering materials, production engineers scheduling the flow of a production line and hundreds of others doing their assigned parts.

Pure or Basic Research

At the basis of all of our accomplishments is what we know about the laws of nature. Even the best equipped engineer can not do more than apply the knowledge provided him by the pure scientist. The fostering of pure science, the expansion of our knowledge of natural forces, is therefore a must for aviation.

Basic, fundamental, or pure research sets the pace of technical progress.

Basic research has to do primarily with the discovery of new facts about nature and with finding and developing principles. Its aim is the advancement of the frontiers of knowledge and the collection of basic information—in many cases guided solely by the curiosity and personal interests of the individual worker and not by the desire to obtain a specific result.

Basic aeronautical research is being conducted mostly by the National Advisory Committee for Aeronautics which was created in 1915. The Committee's research programs have the long range objective of acquiring the new scientific knowledge essential to assure American leadership in aviation. Beyond this, the NACA has the immediate objective of solving some of the more pressing problems resulting from aircraft design concepts.

Most of the research problems are assigned to NACA's own laboratories. Problems of flight propulsion go to the Lewis Flight Propulsion Laboratory at Cleveland. Most aerodynamic research is done at Moffett Field, California. Other research on aerodynamics, structures, hydrodynamics and other problems is done at the Langley Aeronautical Laboratory in Virginia.

These and other NACA installations employ about 7,600 persons.

To supplement the work carried on by NACA facilities, NACA and the military services sponsor and finance a coordinated program of research at a score of non-profit and educational institutions.

Development, or Applied Research

Applied research, or development, is the intricate process by which new knowledge is used by the forces of engineering and industry.

Application of the results of basic research to the design, development, and production of improved aircraft is a function of the aircraft industry. The industry's task is the design and production of aircraft with a specified performance—so fast, so far, so high, so much capacity. Usually such requirements are generated by the using agency, be it military or civil.

The engineers prepare designs to meet these performance specifications. If the design proposal is approved, an experimental model is built to test the feasibility of the approach. Production specialists and design engineers work closely together to make sure that the model can be produced efficiently if ordered into quantity production. Normally a new plane is ordered in quantity only after it has been fully engineered and tested in sample numbers.

Evaluation of military aircraft and equipment is the function of the military services. They study and apply the techniques necessary to get the most out of the new aircraft or equipment.

Measuring the Research and Development Effort

At the beginning of the Second World War the annual outlay for all research and development in the United States was well below one billion dollars.

In 1952 it had risen to more than 3.5 billion dollars. About one half of this money came from the Federal Government.

Only about one-fourth of the government's research and development work was performed in government-owned installations. The rest went to industry, universities, research institutions, etc.

Research and development expenditures by the aircraft industry alone in 1951 (the only year for which the information is available) totaled more than 400 million dollars. About six of every seven dollars spent on aircraft research and development in that year came from Federal funds.

In January 1952 the aircraft industry employed more than 20,000 of the 90,000 professional research engineers and scientists, and 50,000 of the 220,000 total research personnel employed by American industry.

A serious shortage of qualified professional research personnel was felt during the period of expansion of aircraft production following the outbreak of hostilities in Korea. A shortage still exists. For the United States as a whole, the shortage of engineering graduates at the end of 1952 was estimated to be about 100,000.

TABLE 12–1. TOTAL AND RESEARCH AND DEVELOPMENT EXPENDITURES OF THE FEDERAL GOVERNMENT

1940–1954

(Millions of Dollars)

Fiscal Year	Total Federal Expenditures	Expenditures for Research and Development				
		Total	Air Force	National Advisory Committee for Aeronautics	Atomic Energy[a]	Other
1940	$ 9,183	$ 97	$ 8.7	$ 2.2	—	$ 86.1
1941	13,387	222	100.4	2.6	—	119.0
1942	34,187	290	83.8	5.0	—	201.2
1943	79,622	610	115.6	9.8	$ 77	407.6
1944	95,315	1,383	110.2	18.4	730	524.4
1945	98,703	1,606	136.0	24.1	859	586.9
1946	60,703	935	121.0	23.7	366	424.3
1947	39,289	916	153.4	33.5	239	490.1
1948	33,791	865	188.3	37.5	108	531.2
1949	40,057	1,097	225.9	48.7	196	626.4
1950	40,156	1,143	218.4	54.5	221	649.1
1951	44,633	1,342	297.9	61.6	243	739.5
1952	66,145	1,839	523.0	67.4	250	998.6
1953	74,607	2,204.7[b]	609.4[b]	79.0[b]	260[b]	1,256.3[b]
1954	74,100	2,204.4[E]	N.A.	88.0[E]	265.5[E]	N.A.

[a] Atomic Energy Commission and Manhattan Engineer District Research and Development.

[b] Preliminary estimate of actual expenditures for Fiscal Year 1953.

[E] Estimate.

N.A.—Not available.

Sources: National Science Foundation, "Federal Funds for Science: II—The Federal Research and Development Budget, 1952 and 1953", Draft, p. 19, revised June 5, 1953; brought up to date from NSF Bureau of the Budget, Office of Budget Review.

TABLE 12–2. FEDERAL RESEARCH AND DEVELOPMENT EXPENDITURES, BY SELECTED AGENCIES

Fiscal Years, 1952 and 1953

Agency	1952 Actual		1953 Estimated[a]	
	Million Dollars	Percent	Million Dollars	Percent
TOTAL	$1,839.1	100.0	$2,204.7	100.0
Department of Defense	1,315.0	71.5	1,645.9	74.7
Office of the Secretary	—	—	—	—
Department of the Army	316.0	17.2	441.7	20.0
Department of the Navy	476.0	25.9	594.8	27.0
Department of the Air Force	523.0	28.4	609.4	27.7
Atomic Energy Commission	249.6	13.6	260.0	11.8
National Advisory Committee for Aeronautics	67.4	3.7	79.0	3.6
Department of Health, Welfare, and Education	65.1	3.5	74.0	3.3
Department of Agriculture	57.1	3.1	58.3	2.6
Department of the Interior	32.8	1.8	37.0	1.7
Department of Commerce	28.0	1.5	24.4	1.1
All Other Agencies	24.1	1.3	26.1	1.2

[a] Preliminary estimate of actual expenditures for Fiscal Year 1953.

Source: National Science Foundation, "Federal Funds for Scientific Research and Development. Revised Estimates for Fiscal Years 1953 and 1954." June 5, 1953; brought up to date from NSF files.

TABLE 12–3. WHERE THE FEDERAL GOVERNMENT'S RESEARCH AND DEVELOPMENT WORK IS PERFORMED

In government-owned installations	25 percent
Work sponsored at non-profit institutions	15 percent
Work sponsored at profit organizations	60 percent
TOTAL	100 percent

Source: National Science Foundation, "Federal Funds for Science: II—The Federal Research and Development Budget, 1952 and 1953", Draft, page 8.

TABLE 12–4. APPROPRIATIONS FOR THE NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS

1915–1954

(Thousands of Dollars)

Fiscal Year	Appropriation	Fiscal Year	Appropriation
1915	$ 5	1935	$ 1,245
1916	5	1936	1,778
1917	88	1937	5,545
1918	112	1938	1,734
1919	205	1939	3,869
1920	175	1940	4,375
1921	200	1941	11,200
1922	200	1942	19,966
1923	226	1943	25,429
1924	307	1944	38,392
1925	470	1945	45,442
1926	534	1946	26,015
1927	513	1947	30,814
1928	550	1948	43,449
1929	629	1949	48,652
1930	1,508	1950	128,000[a]
1931	1,321	1951	63,068
1932	1,051	1952[b]	69,000
1933	915	1953[b]	66,286
1934	957	1954[b]	62,439

[a] $75,000,000 appropriated for Unitary Plan Wind Tunnels.

[b] Includes construction.

Source: 1915–1945: The Budget of the United States Government.
1946–1954: National Advisory Committee for Aeronautics, letter of June 16, 1953.

TABLE 12–5. COST OF RESEARCH AS A PERCENTAGE OF SALES, BY INDUSTRY

1951

Industry	Percent
ALL INDUSTRIES	2.0
Manufacturing	2.0
Aircraft and Parts	12.7
Electrical Machinery	6.4
Chemical and Allied Products	2.5
Non-Manufacturing	1.7

Source: Bureau of Labor Statistics and Research and Development Board, "Industrial Research and Development. A Preliminary Report", January 1953, page 38.

TABLE 12–6. INDUSTRIAL RESEARCH: COST AND SOURCE OF FINANCING
1951
(Cost in Millions of Dollars)

Industries	Cost	Percent Federally Financed
ALL INDUSTRIES	$1,783.7	47.0
Manufacturing	1,613.5	46.5
Aircraft and Parts	410.1[a]	85.0
Electrical Machinery	431.9	57.0
Chemicals and Allied Products	204.2	7.1
All Other Manufacturing	567.3	24.8
Non-Manufacturing	170.2	50.8

[a] Companies were classified by industries according to the largest portion of their total sales. Thus cost of aircraft research in such companies as General Electric, Westinghouse, General Motors, etc., is not listed under "Aircraft and Parts" but under "Electrical Machinery", "Motor Vehicles", and elsewhere. The cost of aircraft research is thus undoubtedly greater than here indicated.

Source: Bureau of Labor Statistics and Research and Development Board, "Industrial Research and Development. A Preliminary Report", January 1953, pages 37 and 38.

TABLE 12–7. RESEARCH PERSONNEL IN INDUSTRY
January 1952

Industry	Research Engineers and Scientists	Total Research Employees
ALL INDUSTRIES	89,851[a]	220,157[a]
Manufacturing	79,303	196,517
Aircraft and Parts	20,166[b]	49,915[b]
Electrical Machinery	17,243	51,172
Chemicals and Allied Products	13,181	23,211
All Other Manufacturing	28,713	72,219
Non-Manufacturing	10,548	23,640

[a] If companies that failed to supply information are included, the total number of research engineers and scientists is estimated as 94,000, the total number of research employees as 234,000.

[b] Companies were classified by industries according to the largest portion of their total sales. Thus, research personnel engaged in aircraft work in such companies as General Electric Company, Westinghouse Electric Corporation, General Motors Corporation, etc., are not listed under "Aircraft and Parts" but under "Electrical Machinery", "Motor Vehicles", or elsewhere. The number of such personnel engaged in aircraft research is thus undoubtedly greater than here indicated.

Source: Bureau of Labor Statistics and the Research and Development Board, "Industrial Research and Development. A Preliminary Report", January 1953, pages 33 and 34.

CHAPTER XIII

AVIATION AND OTHER MEANS OF TRANSPORTATION

The competitive American transportation system offers a variety of passenger and freight transportation unparalleled in the world. Passengers can travel by automobile, bus, rail, air and—where available—water. Similarly, shippers can send freight by rail, water, truck or air. Producers and users of petroleum products have the additional choice of pipeline transport.

This variety of competitive transportation media contributes to better living, economic growth, and the military strength of the nation.

The overall result is an enormous increase in the use of all forms of transportation. A hundred years ago, the average citizen traveled little. Even in 1916, the golden age of the railroad, the average travel per person in America was only 352 miles per year. Today, the average person travels more than 3,000 miles per year, and all indications are that average annual travel will continue to increase.

The importance of transportation to the economy of the United States is brought out by the fact that all forms of transportation contribute about five percent of the total national income.

Air Transportation Is Increasing

Today, aviation provides high-speed transportation, at reasonable cost, between major communities which are two hundred miles or more apart. Airlines already carry a sizeable percentage of all inter-city traffic, and present forecasts leave little doubt that aviation's share of such traffic will be greatly expanded in the near future.

Competitive Fares

The Air Transport Association reports that in terms of the 1939 dollar, domestic trunkline passenger transportation costs 40 percent less than 14 years ago—or less than three cents a mile.

In 1926, airline travel per mile cost three and a half times as much as rail coach. Today, scheduled air coach costs only 60 percent more than rail coach, and non-scheduled air coach costs only 20 percent more. Comparative air and rail costs are even closer than the above figures indicate because (1) airline mileage between cities is, on the whole, 10 to 20 percent shorter than rail mileage, and (2) the value of time saved by air travel.

Safety of Transportation

The National Safety Council, recognized authority in the field of safety, uses two criteria for the measurement of transportataion safety:

(1) The first measure is the total number of deaths—passengers, pedestrians, and others—caused by the various means of transportation per hundred million passenger-miles traveled. By this yardstick, the airlines' record is the best of all forms of transportation.

(2) The second measure is the number of passenger deaths per hundred million passenger-miles. By this yardstick, airline safety is superior to passenger automobiles and taxis, but below that of railroad or bus travel. In 1952, the U. S. scheduled domestic air carriers established a safety record of 0.38 fatalities per hundred million passenger-miles. This compares favorably with 1.3 in 1951 and 1.1 in 1950, the previous record year.

A total of more than 33,000 persons were killed in 1952 by automobile, railroad, bus and air transport accidents in the United States. Passenger cars and taxis accounted for 31,500 of these deaths, railroad passenger trains for 1,163, busses for 610, and scheduled airliners for 67.

TABLE 13–1. THE TRANSPORTATION INDUSTRY'S CONTRIBUTION TO NATIONAL INCOME 1929–1952

(Billions of Dollars)

Year	Contribution of All Industries	Transportation Industry				
		Total	Air Transportation (Common Carrier)	Railroads	Highway Transportation	Water, Pipeline, Local and Other Transportation
1929	87.4	6.6	[a]	4.6	.7	1.3
1930	75.0	5.5	[a]	3.8	.7	1.0
1931	58.9	4.3	[a]	2.8	.6	.9
1932	41.7	3.1	.01	2.0	.5	.6
1933	39.6	3.0	.01	1.8	.5	.7
1934	48.6	3.3	.01	2.0	.5	.8
1935	56.8	3.6	.02	2.2	.6	.8
1936	66.9	4.2	.02	2.6	.7	.9
1937	73.6	4.5	.03	2.8	.7	1.0
1938	67.4	4.0	.03	2.4	.7	.9
1939	72.5	4.5	.04	2.7	.8	1.0
1940	81.3	4.9	.06	2.9	.9	1.0
1941	103.8	6.2	.08	3.8	1.2	1.1
1942	137.1	8.5	.11	5.6	1.5	1.3
1943	169.7	10.7	.15	7.0	1.8	1.7
1944	183.8	11.2	.18	7.0	2.0	2.0
1945	182.7	10.5	.19	6.0	2.0	2.3
1946	180.3	10.2	.22	5.5	2.5	2.0
1947	198.7	11.5	.24	6.3	2.7	2.3
1948	223.5	12.6	.30	7.2	3.0	2.1
1949	216.3	11.9	.34	6.4	3.1	2.1
1950	240.6	13.3	.42	7.2	3.6	2.1
1951	278.4	14.9	.54	7.8	4.0	2.6
1952	291.6	15.5	.63	7.8	4.3	2.8

[a] Less than 5 million dollars.

Sources: U. S. Department of Commerce, "National Income," 1951 Edition; Survey of Current Business, National Income Number," July 1952, July 1953.

TABLE 13–2. CORPORATE SALES OF THE TRANSPORTATION INDUSTRY
1929–1952
(Millions of Dollars)

Year	All Industries	TRANSPORTATION INDUSTRY				
		TOTAL	Air Transportation (Common Carrier)	Railroads	Highway Transportation	Water, Pipeline, Local and Other Transportation
1929	138,640	9,688	34	6,933	858	1,863
1930	118,294	8,453	44	5,840	875	1,694
1931	92,365	6,985	67	4,737	781	1,400
1932	69,185	5,525	61	3,584	639	1,241
1933	73,027	5,470	59	3,520	677	1,214
1934	89,553	6,139	32	3,702	793	1,612
1935	101,953	6,453	44	3,853	894	1,662
1936	119,462	7,319	52	4,511	998	1,758
1937	128,884	7,683	63	4,630	1,127	1,863
1938	108,551	6,682	65	4,138	952	1,527
1939	120,789	7,364	88	4,632	1,055	1,589
1940	135,248	7,769	131	4,722	1,134	1,782
1941	176,181	9,526	187	5,840	1,427	2,072
1942	202,777	11,527	191	7,887	1,696	1,753
1943	233,435	13,661	223	9,610	1,964	1,864
1944	246,737	14,307	263	10,045	2,030	1,969
1945	239,512	14,052	327	9,699	2,093	1,933
1946	270,898	13,786	193	8,612	2,494	2,487
1947	347,801	16,717	662	9,567	3,010	3,478
1948	388,744	18,373	782	10,645	3,568	3,378
1949	370,079	17,164	836	9,356	3,837	3,135
1950	431,880	18,805	957	10,200	4,519	3,129
1951	495,259	21,427	1,130	11,189	5,014	4,094
1952	510,954	22,261	1,272	11,390	5,401	4,198

Source: U. S. Department of Commerce, "National Income," 1951 Edition; "Survey of Current Business, National Income Number," July 1952, July 1953.

TABLE 13-3. AVERAGE REVENUE PER PASSENGER-MILE
1926-1952
(Cents)

Year	AIRLINES		RAILROAD		INTER-CITY BUS
	Domestic Scheduled	Domestic Non-Scheduled[a]	Coach (Excluding Commuter)	Parlor and Sleeping Car (inc. Pullman)	
1926	12.0	—	3.35	N.A.	2.96
1927	10.6	—	3.34	N.A.	2.96
1928	11.0	—	3.31	N.A.	2.99
1929	12.0	—	3.29	N.A.	2.84
1930	8.3	—	3.25	N.A.	2.78
1931	6.7	—	3.06	N.A.	2.72
1932	6.1	—	2.70	N.A.	2.80
1933	6.1	—	2.35	N.A.	2.40
1934	5.9	—	2.17	N.A.	2.32
1935	5.7	—	2.18	N.A.	2.54
1936	5.7	—	2.02	N.A.	2.40
1937	5.6	—	1.80	3.08	1.73
1938	5.2	—	1.86	3.01	1.71
1939	5.1	—	1.80	2.98	1.55
1940	5.1	—	1.83	3.00	1.46
1941	5.0	—	1.64	2.88	1.46
1942	5.3	—	1.77	2.95	1.65
1943	5.3	—	1.74	2.94	1.69
1944	5.4	—	1.70	3.03	1.65
1945	5.0	—	1.71	2.95	1.64
1946	4.6	—	1.82	3.06	1.65
1947	5.1	—	2.02	3.53	1.70
1948	5.8	—	2.29	3.91	1.74
1949	5.76	3.71	2.41	4.06	1.84
1950	5.55	2.76	2.47	4.17	1.87
1951	5.60	2.93	2.47	4.41	1.93
1952	5.60	3.20[b]	2.53	4.60	2.02[E]

E—Estimate.

N.A.—Not available.

[a] Figure for large non-certificated non-scheduled domestic airlines which had no cargo traffic.

[b] Excludes all charter operations. Based on operations of 24 airlines for quarter ending March 31, 1953 and 23 airlines for quarter ending June 30, 1953.

Sources: 1926-1948: Data obtained from Civil Aeronautics Administration, Interstate Commerce Commission and Aircraft Industries Association, "Aviation Facts and Figures, 1945".

1949-1953: Interstate Commerce Commission, "Monthly Comment on Transportation Statistics", Jan. 14, 1953, p. 12; brought up to date from ICC files. Intercity Bus figures for 1952 from National Association of Motor Bus Operators.

TABLE 13–4. WAGES AND SALARIES[a] IN THE TRANSPORTATION INDUSTRY
1929–1952
(Millions of Dollars)

Year	All Industries	Transportation Industry				
		Total	Air Transportation (Common Carrier)	Railroads	Highway Transportation	Water, Pipelines, Local and Other Transportation
1929	$ 50,165	$4,719	$ 5	$3,226	$ 500	$ 988
1930	45,894	4,237	9	2,849	478	901
1931	38,886	3,531	13	2,334	422	762
1932	30,284	2,656	14	1,688	358	596
1933	28,825	2,455	14	1,560	337	544
1934	33,520	2,660	14	1,689	369	588
1935	36,508	2,884	17	1,831	415	621
1936	41,754	3,237	22	2,058	460	697
1937	45,948	3,549	26	2,219	522	782
1938	42,812	3,179	29	1,962	508	680
1939	45,745	3,429	34	2,091	561	743
1940	49,587	3,635	43	2,207	630	755
1941	61,708	4,261	55	2,615	775	816
1942	81,887	5,260	77	3,285	982	916
1943	105,647	6,547	113	3,957	1,184	1,293
1944	116,924	7,525	130	4,377	1,310	1,708
1945	117,673	7,888	150	4,405	1,437	1,896
1946	111,227	8,478	231	4,771	1,738	1,738
1947	122,059	9,045	268	4,956	1,975	1,846
1948	134,357	9,664	287	5,376	2,209	1,792
1949	133,356	9,275	298	4,997	2,271	1,709
1950	145,573	9,794	313	5,199	2,581	1,701
1951	169,839	11,270	376	5,974	2,939	1,981
1952	183,643	11,764	462	5,991	3,219	2,092

[a] Excluding supplements such as employer contributions to social insurance, compensation for injury, etc.

Source: U. S. Department of Commerce, "National Income," 1951 Edition; "Survey of Current Business, National Income Number" July 1952, July 1953.

TABLE 13–5. AVERAGE PASSENGER LOADS
1939–1952
(Passenger-Miles per Vehicle-Mile)

Year	Class I Railways			Class I Inter-City Busses	Scheduled Domestic Airliners
	Coaches[a]	Sleeping or Parlor Cars	All Passenger-carrying Cars[a]		
1939	17.0	9.3	13.4	16.4	7.9
1940	18.4	9.1	14.1	17.2	9.1
1941	20.3	10.5	15.8	18.7	9.9
1942	28.8	16.5	23.1	21.3	12.2
1943	39.3	20.3	31.1	24.3	15.1
1944	41.0	20.3	31.9	24.9	15.2
1945	38.7	19.8	30.2	24.5	15.4
1946	32.0	16.0	24.5	21.7	18.2
1947	27.1	13.0	21.0	20.1	18.5
1948	25.3	11.9	19.4	19.6	17.2
1949	23.6	11.0	18.1	18.4	19.2
1950	22.2	10.9	17.0	18.4	22.0
1951	23.8	11.6	18.1	18.7[b]	26.0
1952	26.7[b]	11.3[b]	19.4[b]	18.4[b]	28.4

[a] Includes commuters.
[b] Preliminary estimate.
Source: Interstate Commerce Commission, "Monthly Comment on Transportation Statistics", June 9, 1953, p. 13.

TABLE 13–6. TRANSPORTATION ACCIDENT DEATH RATES
1952
Deaths per 100 Million Passenger-Miles

	Passenger Deaths	All Deaths[a]
Scheduled Air Transports	.35	.52
Railroad Passenger Trains	.04	3.4
Busses	.16	1.0
Passenger Automobiles and Taxis[b]	2.8	3.9

[a] Includes pedestrians, employees, trespassers, etc., as well as passengers or drivers.
[b] Drivers considered as passengers.
Source: National Safety Council, "Accidents Facts" (Annually).

TABLE 13–7. AIR VS. RAILROAD PASSENGER TRAVEL
1937–1952
(Passenger-Miles in Millions)

Year	Domestic Air Carriers			Railroads (excluding Commutation)			Air as Percent of Railroad
	TOTAL	Scheduled	Irregular[a]	TOTAL	Pullman	Coach	
1937	.4	.4	—	21.6	9.2	12.4	1.9
1938	.5	.5	—	18.5	8.3	10.2	2.7
1939	.7	.7	—	19.6	8.5	11.1	3.6
1940	1.1	1.1	—	20.7	8.2	12.5	5.3
1941	1.4	1.4	—	26.2	10.1	16.1	5.3
1942	1.4	1.4	—	50.0	19.1	30.9	2.8
1943	1.6	1.6	—	83.8	25.9	57.9	1.9
1944	2.2	2.2	—	91.7	28.3	63.4	2.4
1945	3.4	3.4	—	86.7	27.3	59.4	3.9
1946[a]	6.0	5.9	N.A.	59.7	20.7	39.0	10.1
1947[a]	6.3	6.1	N.A.	41.2	13.5	27.7	15.3
1948[a]	6.3	6.0	N.A.	36.5	12.2	24.3	17.3
1949	7.4	6.8	.6	30.8	10.5	20.3	24.0
1950	8.8	8.0	.8	26.6	9.2	17.4	33.1
1951	11.7	10.6	1.1	29.4	9.9	19.5	39.8
1952	13.8	12.5	1.3	29.1	9.3	19.8	47.4

[a] Figures for irregular carriers include some international service; no data available until 1949. Until 1946 irregular carriers were not important in domestic passenger service. A small adjustment in totals is made to allow for non-available figures 1946–1948.

Sources: Scheduled Air Carriers: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950"; brought up to date from CAA files.

Irregular Air Carriers: Civil Aeronautics Board; unpublished data.

Railroads: Interstate Commerce Commission; unpublished data.

TABLE 13-8. ESTIMATED TOTAL INTERCITY PASSENGER-MILES TRAVELED 1916–1952

Year	Passenger-Miles (Billions)	Population[a] (Millions)	Passenger-Miles Per Person
1916	36.0	102.0	352.9
1939	270.8	130.9	2,068.7
1941	310.6	133.1	2,333.5
1944	233.9	132.6	1,763.9
1947	351.3	143.4	2,449.7
1951	449.1	153.4	2,895.6
1952	470.0[E]	155.8	3,016.7

[E] Estimate.

Note: 1952 data not yet compiled.

[a] Excludes U. S. residents serving overseas in the armed forces.

Sources: Passenger-Miles: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950", brought up to date from CAA files.

Bureau of the Census, "Historical Statistics of the United States, 1789–1945."

Interstate Commerce Commission, unpublished data.

U. S. Army, Chief of Engineers.

Population: Bureau of the Census, "Statistical Abstract of the United States, 1952", p. 10. Brought up to date from Bureau of the Census Files.

TABLE 13-9. AMERICA'S TRANSPORTATION NETWORK (Thousands of Miles)

Transportation Medium	1930	1940	1952
Total Rural Roads	3,009	3,017	3,026[a]
Surfaced	694	1,367	1,714[a]
Federal-Aid Primary Highways	193	234	235[b]
Railroads—Road Owned	249	234	223[b]
Petroleum Pipe Lines	89	100	131[b]
Waterways and Great Lakes[c]	28	28	28
Airways (Domestic)	30	43	78

[a] 1950.

[b] 1951.

[c] Waterways which are under federal improvement for navigation (all depths).

Sources: Bureau of the Census "Historical Statistics of the United States, 1789–1945"; brought up to date from "Statistical Abstract of the United States, 1952."

Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950"; brought up to date from CAA files.

U. S. Army, Chief of Engineers, Board of Engineers for Rivers and Harbors, "Mileage of United States Waterways authorized for Improvement and Improved by the Corps of Engineers", June 30, 1952.

TABLE 13–10. ESTIMATED INTERCITY PASSENGER TRAFFIC, BY TYPE
1916–1952

Year	TOTAL	Domestic Air Carriers	Railroads[a]	Highways	Inland Waterways
Billions of Passenger-Miles					
1916	36.0	[b]	35.2	[b]	.8
1939	270.7	.7	22.7	245.9	1.5
1941	310.6	1.4	29.4	278.0	1.8
1944	233.9	2.2	95.7	134.1	1.9
1947	351.3	6.1[c]	46.0	297.4	1.8
1951	449.1	11.6[c]	35.3	400.8	1.4
1952[E]	470.0	14.0	35.0	420.0	1.0
Percent					
1916	100.0	[b]	97.8	[b]	2.2
1939	100.0	.3	8.4	90.8	.5
1941	100.0	.4	9.5	89.5	.6
1944	100.0	1.0	40.9	57.3	.8
1947	100.0	1.7	13.1	84.7	.5
1951	100.0	2.6	7.9	89.2	.3
1952[E]	100.0	3.0	7.4	89.4	.2

E—Estimate.

Note: A recent estimate which excludes commutation travel on railroads and passenger-car trips of 50 miles or less arrives at a figure of 6.1 percent for air carriers for 1952.

[a] Includes commutation and electrified divisions of steam railway companies, but excludes electric railways.

[b] Negligible.

[c] Scheduled and irregular carriers.

Sources: Domestic Air Carriers: Civil Aeronautics Administration, "Statistical Handbook of Civil Aviation, 1950"; brought up to date from CAA files.

Railroads: Bureau of the Census, "Historical Statistics of the United States, 1789–1945". Interstate Commerce Commission, unpublished data.

Highways Estimates: Interstate Commerce Commission, unpublished data.

Inland Waterways: U. S. Army, Chief of Engineers; Interstate Commerce Commission; unpublished data.

Note: Hearings before a Subcommittee of the Select Committee on Small Business, U. S. Senate, 83rd Congress, First Session on "Future of Irregular Airlines in United States Air Transportation Industry," p. 514.

TABLE 13–11. ESTIMATED INTERCITY FREIGHT TRAFFIC, BY TYPE
1916–1952

Year	TOTAL	Domestic Air Carriers	Railroads	Highways	Inland Waterways	Pipe Lines
Billions of Ton-Miles						
1916	475.0	[a]	366.2	[a]	87.8	21.0
1939	527.3	.01	338.9	43.9	88.9	55.6
1941	744.4	.02	481.8	63.3	130.9	68.4
1944	1,064.2	.07	746.9	47.4	137.0	132.9
1947	983.7	.16	664.5	77.9	136.0	105.2
1951	1,172.5	.30	655.4	182.5[c]	182.2	152.1
1952	1,135.5	.40	623.5	184.1[c]	170.0	157.5
Percent						
1916	100.0	[a]	77.1	[a]	18.5	4.4
1939	100.0	[b]	64.3	8.3	16.9	10.5
1941	100.0	[b]	64.7	8.5	17.6	9.2
1944	100.0	.01	70.2	4.4	12.9	12.5
1947	100.0	.02	67.6	7.9	13.8	10.7
1951	100.0	.03	55.9	15.6	15.5	13.0
1952	100.0	.04	54.9	16.2	15.0	13.9

Note: 1952 figures not yet compiled.

[a] Negligible.

[b] Less than .005 percent.

[c] Highway figures have been expended to cover facilities (turnpikes) not previously covered, to revise rural-to-rural estimates, and to include urban ton-miles in intercity traffic not heretofore available.

Sources: 1916: Bureau of the Census: "Historical Statistics of the United States, 1789–1945".

Aircraft Industries Association, "Aviation Facts and Figures, 1945" p. 137.

1939–1947: Interstate Commerce Commission, "Volume of Intercity Freight Traffic, Public and Private, by Kinds of Transportation, 1939–1949".

1951–1952: Interstate Commerce Commission, "Monthly Comment on Transportation Statistics," Oct. 15, 1953.

TABLE 13-12. PERSONAL CONSUMPTION EXPENDITURES FOR TRANSPORTATION 1929-1952

(Millions of Dollars)

Year	TOTAL	User-Operation Transportation[a]	Purchased Local Transportation[b]	Airlines	Railroads[c]	Other[d]
1929	7,496	5,748	1,131	3	413	201
1930	6,061	4,498	1,063	2	333	165
1931	4,928	3,617	932	2	247	130
1932	3,924	2,839	794	3	170	118
1933	3,920	2,940	728	3	154	95
1934	4,514	3,474	769	4	169	98
1935	5,179	4,102	799	6	153	119
1936	6,044	4,825	855	8	210	146
1937	6,432	5,147	882	8	232	163
1938	5,549	4,318	848	8	209	166
1939	6,250	4,967	885	11	216	171
1940	7,007	5,686	913	18	214	176
1941	8,241	6,777	985	23	232	224
1942	5,387	3,376	1,298	22	364	327
1943	5,633	2,844	1,653	24	664	448
1944	5,903	2,969	1,732	32	671	499
1945	6,694	3,691	1,753	54	678	518
1946	11,648	8,403	1,957	106	616	566
1947	14,876	11,619	2,000	119	580	558
1948	16,867	13,468	2,123	133	577	566
1949	19,274	15,995	2,094	151	513	521
1950	22,570	19,353	2,084	174	446	513
1951	22,104	18,690	2,134	231	500	549
1952	22,509	18,959	2,187	272	536	555

Note: The figures shown represent expenditures for consumer use only. They do not include business and government use which makes up about two-thirds of airline passenger revenue and probably a similar percentage of Pullman revenue.

[a] This is made up of expenditures for new cars, tires, tubes, gas, oil, repair, tolls, insurance, etc.

[b] This is made up of expenditures for streetcars, subways, taxis, commutation tickets, and ferries.

[c] Excludes commutation but includes sleeping and parlor cars and tips.

[d] Includes inter-city bus, waterways, baggage transfer and luggage.

Source: U. S. Department of Commerce, "National Income 1951"; "Survey of Current Business, National Income Number" July 1952, July 1953.

TABLE 13–13. CORPORATE[a] INCOME, TAXES AND DIVIDENDS IN THE TRANSPORTATION INDUSTRY

1952

(Millions of Dollars)

	ALL INDUSTRY	ALL TRANSPORTATION	Air Transportation (Common Carrier)	Railroads	Highway Transportation	Water, Pipeline, and Other Transportation
Income before Taxes...	$39,216	$1,994	$132	$1,132	$241	$489
Tax Liability.....	20,635	1,033	62	593	137	241
Income after Taxes.....	18,581	961	70	539	104	248
Dividend Payments....	9,107	380	13	217	62	88
Undistributed Income..	9,474	581	57	322	42	160
Net Interest Payments..	7,027	346	1	284	41	20

[a] All railroads, air transportation, and pipelines are corporations. Unincorporated transportation enterprises are limited almost entirely to highway transportation and are not included in this table.

Source: U. S. Department of Commerce, "Survey of Current Business, National Income Number," July 1953.

TABLE 13–14. TRANSPORTATION ACCIDENT DEATH RATES

1952

Kind of Transportation	Passenger Miles (Millions)	Deaths	Death Rate per 100,000,000 Passenger Miles
Passenger Deaths in—			
passenger automobiles[a] and taxis.....	800,000	22,600	2.8
busses.....	62,000	100	.16
railroad passenger trains.....	34,040	14	.04
scheduled air transport planes.....	13,000	46	.35
All Deaths[b] connected with the operation of			
passenger automobiles[a] and taxis.....	800,000	31,500	3.9
busses.....	62,000	610	1.0
railroad passenger trains.....	34,040	1,163	3.4
scheduled air transport planes.....	13,000	67	.52

[a] Drivers of passenger automobiles are considered passengers.

[b] All persons—pedestrians, trespassers and others, as well as passengers—killed in the operation of the vehicles are included.

Source: National Safety Council, "Accidents Facts" (Annually).

TABLE 13–15. TRANSPORTATION ACCIDENT DEATH RATES
1936–1952
Passenger Fatalities per 100 Million Passenger-Miles

Year	Passenger Automobiles and Taxis	Busses	Railroad Passenger Trains	Domestic Scheduled Airlines
1936	4.5	N.A.	.09	10.0
1937	4.7	N.A.	.09	8.4
1938	3.9	N.A.	.36	4.5
1939	3.7	N.A.	.14	1.2
1940	3.5	N.A.	.34	3.0
1941	4.0	.24	.14	2.3
1942	2.7	.23	.17	3.7
1943	2.7	.22	.31	1.3
1944	2.9	.22	.26	2.2
1945	2.9	.17	.16	2.2
1946	2.5	.19	.18	1.2
1947	2.3	.21	.16	3.2
1948	2.1	.18	.13	1.3
1949	2.7	.20	.08	1.3
1950	2.9	.17	.58	1.1
1951	2.9	.21	.43	1.3
1952	2.8	.16	.04	.35

N.A.—Not available.
Source: National Safety Council, "Accidents Facts", (Annually).

TABLE 13–16. EMPLOYMENT, WAGES AND AVERAGE ANNUAL EARNINGS IN THE TRANSPORTATION INDUSTRY

1952

	ALL INDUSTRY	ALL TRANSPORTATION	Air Transportation (Common Carrier)	Railroads	Highway Transportation	Water, Pipeline, and Other Transportation
Full-Time Equivalent Employees (Thousands)	53,575	2,773	97	1,382	797	497
Wages and Salaries (Million Dollars)	$183,643	$11,764	$462	$5,991	$3,219	$2,092
Supplements to Wages and Salaries[a] (Million Dollars)	$9,585	$719	$35	$439	$138	$107
Average Annual Earnings (Dollars)	$3,428	$4,242	$4,763	$4,335	$4,039	$4,209

[a] Employer contributions to social insurance, compensation for injury, etc.

Source: U. S. Department of Commerce: "Survey of Current Business, National Income Number," July 1953.

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