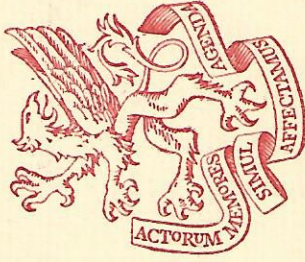


Bell, Lawrence

Lawrence D. Bell  
A Man and His Company

"Bell Aircraft"

LESTON FANEUF



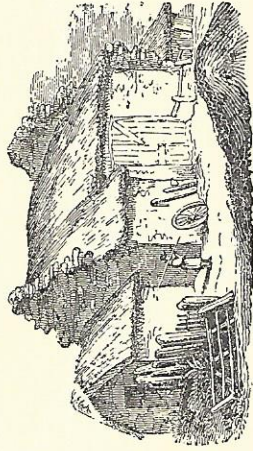
*"The roads you travel so briskly  
lead out of dim antiquity,  
and you study the past chiefly because  
of its bearing on the living present  
and its promise for the future."*

—LIEUTENANT GENERAL JAMES G. HARBORD,  
K.C.M.G., D.S.M., LL.D., U.S. ARMY (RET.)  
(1866-1947)

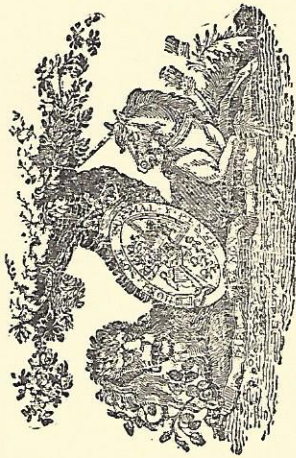
*Late American Member of Council at London  
The Necocomen Society of England*

LAWRENCE D. BELL  
A MAN AND HIS COMPANY  
"Bell Aircraft"

An Address at Buffalo



AMERICAN NEWCOMEN, through the years, has honored numerous corporate enterprises, both in the United States of America and in Canada—and within many fields. The present Newcomen manuscript deals with the life and work of an aircraft builder and pioneer, whose foresight, resourcefulness, determination, and abiding Faith yielded conspicuous contributions to America and to Aviation!



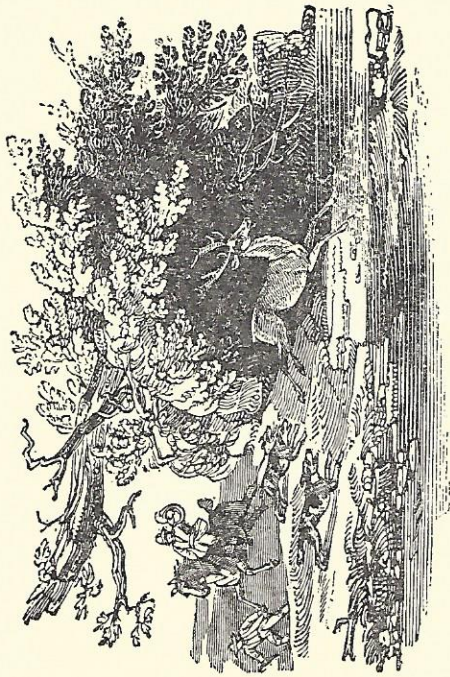
"Were American Newcomen to do naught else, our work is well done if we succeed in sharing with America a strengthened inspiration to continue the struggle towards a nobler Civilization—through wider knowledge and understanding of the hopes, ambitions, and deeds of leaders in the past who have upheld Civilization's material progress. As we look backward, let us look forward."

—CHARLES PENROSE  
Senior Vice-President for North America  
The Newcomen Society of England



This statement, crystallizing a broad purpose of the society, was first read at the Newcomen Meeting at New York World's Fair on August 5, 1939, when American Newcomen were guests of The British Government

"Actorum Memores simul affectamus Agenda"



# Lawrence D. Bell

## A Man and His Company

### "Bell Aircraft"

LESTON FANEUF

MEMBER OF THE NEWCOMEN SOCIETY

PRESIDENT

BELL AIRCRAFT CORPORATION  
BUFFALO



"We, at Bell Aircraft Corporation, are grateful for this dinner honoring our Company. But no event ever can honor 'Bell Aircraft' without first, and at the same time, honoring Larry Bell. And this is even more so, when an event like this dinner occurs a scant 18 months after his untimely death.

"While the airplane as we know it today, is only 55 years old, actually most of the rapid aviation developments so familiar to us have come in the last two decades, almost precisely the life span of 'Bell Aircraft.'"

—LESTON FANEUF



THE NEWCOMEN SOCIETY IN NORTH AMERICA  
NEW YORK    SAN FRANCISCO    MONTREAL

1958

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LESTON FANEUF



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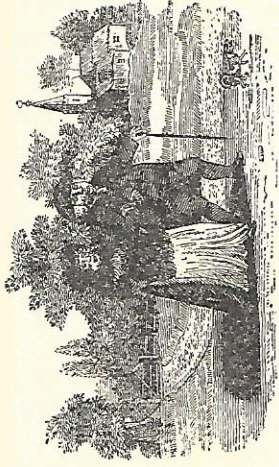
*First Printing: June 1958  
Second Printing: June 1958*



*This Newcomen Address, dealing with the  
history of Bell Aircraft Corporation, was de-  
livered at the "1958 Niagara Dinner" of The  
Newcomen Society in North America, held at  
Buffalo Club, in Buffalo, New York, U.S.A.,  
when Mr. Faneuf was the guest of  
honor, on May 15, 1958*



SET UP, PRINTED AND BOUND IN THE UNITED STATES  
OF AMERICA FOR THE NEWCOMEN PUBLICATIONS IN  
NORTH AMERICA BY PRINCETON UNIVERSITY PRESS



INTRODUCTION OF MR. FANEUF, AT BUFFALO ON MAY  
15, 1958, BY LEWIS G. HARRIMAN, CHAIRMAN OF THE  
BOARD, MANUFACTURERS AND TRADERS TRUST COMPANY,  
BUFFALO; VICE-CHAIRMAN OF THE NIAGARA COMMIT-  
TEE, IN THE NEWCOMEN SOCIETY IN NORTH AMERICA.

*My fellow members of Newcomen:*

**I**N this generation of intense specialization, it is rare indeed to find a man whose talents seemingly have no bounds. As a teacher, newspaperman, government official, banker, and industrialist, our guest speaker has served with devotion and distinction.



It has been my privilege and pleasure to know the only two Presidents of Bell Aircraft Corporation. One was a pioneer; a man born and bred in aviation almost from the days of Kitty Hawk.



Larry Bell's place in his field was unique, not only because of his great acumen, but because he made aviation his life, his love.

Filling the position his death vacated in October 1956 would have been a major task for his Company had not Larry already handpicked and carefully groomed his successor, recommending his election as president, only one month and two days before Larry died.



Leston Faneuf worked closely with Larry Bell for fourteen years and absorbed much of Larry's spirit to add to his own inherent abilities. The presidential assignment was no small one for

him either, but in his varied and interesting career, transition from one important position to another of greater responsibility characteristically has been smooth.



I like to think that this adaptability has been so effective because Les Faneuf never has lost sight of what I would call the humanities. He never has been too busy building a career that he could not and did not take time to serve his fellowman in civic and public office, in education, in charitable and cultural endeavors.

He was the first Chairman of the New York State Apprentice Council and he now serves on the Governor's committee for employment of the physically handicapped. He is one of the original Directors of Kleinhans Music Hall, is a member of the board of the Buffalo Fine Arts Academy, and served on the Buffalo Board of Education under three mayors.

Somehow he finds time to serve on advisory boards of hospitals, universities and colleges, chambers of commerce, and organizations such as Associated Industries of New York State and the "Crusade for Freedom." As president of the Bell Foundation, Inc., he directs the allocation of substantial funds in support of worthy educational, medical, charitable, and philanthropic causes.

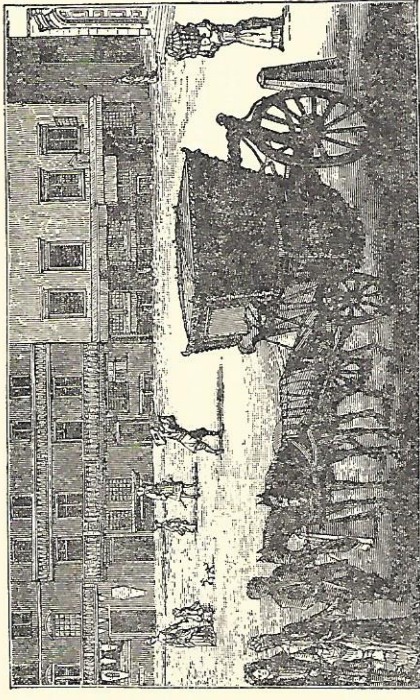
He does these things because he feels that it is an obligation of management to support actively these vital facets of our way of life. These contributions have not gone unnoticed. Grateful educators, for instance, have accorded him two honorary degrees, Doctor of Laws and Doctor of Engineering. His other accolades are numerous.



Born in a small town in Vermont and a graduate of Norwich University at a time when that military school featured horse cavalry, he has, in the past few months, witnessed another kind of transition—his son earned his wings as a jet pilot in the United States Air Force.



It is both an honor and a privilege to introduce to you the President of Bell Aircraft, a dynamic Company in a space age industry:—LESTON FANEUF.



*My fellow members of Newcomen:*

**I**T may seem somewhat incongruous for me to be speaking at this dinner of The Newcomen Society as the President of an aircraft company which designed and built the world's highest and fastest manned airplane.



I say incongruous because I will have to go back more than 250 years to draw a simile between the piston steam engine and the pumping machine of Thomas Newcomen and the famous rocket powered X-2 research airplane of Larry Bell.



On the other hand, *Mr. Chairman*, perhaps it entirely is fitting and proper to link Thomas Newcomen and Larry Bell. It is obvious that Newcomen's forward-looking work, in 1712, paved the way for future steam engine developments that proved as significant to its era as some of the aircraft, missiles, and rocket planes of Larry Bell's Company are proving today and will prove tomorrow and the day after.



No inventor, no pioneer, no industrial explorer is ever probably completely first and solely responsible for something wholly and absolutely new.

Two years later, he was a mechanic with the Martin Company whose work shop was an abandoned church in Los Angeles. The Martin Company was listed in the telephone directory under *amusements!*



Exhibition flying was the answer to survival. While Glenn Martin made low-level passes at a county fair, dropping oranges like miniature bombs, Larry would be concealed on the ground, exploding black powder charges he had hidden the night before. Sometimes they used a crude wooden fort for more realism, pulling the fort down in sections as the powder exploded. This was billed as "*The Battle of the Clouds.*" This—was only 1914.



In 1917, Martin built a new plant in Cleveland and Larry was the factory manager. Donald W. Douglas, Sr. was the chief engineer, the first man to be hired by any company specifically as an aeronautical engineer. A year later, Larry hired another man whose name was destined to become famous in aviation: J. H. (Dutch) Kindelberger, now Chairman of the Board, North American Aviation Company.



Larry had solid training under two great leaders in the aviation industry, although the two were totally and diametrically opposite in every facet of their personalities and operations, Glenn Martin and Major Reuben Fleet.



Three opportunities were presented to Larry in 1928. He had a chance to join Major Fleet as sales manager for "Consolidated," become factory manager of "Boeing," or President of another company which died aborning. He joined Fleet when he was given an opportunity to participate in the ownership of the Company, something Martin never had permitted.



In 1935, when Major Fleet decided to move his Consolidated Aircraft Company to San Diego, California, Larry, who then was

Vice-President and General Manager of "Consolidated," decided to stay behind in Buffalo and try to gather the funds necessary to start his own Company. He recruited the aid of two senior "Consolidated" men, Ray Whitman and Bob Woods, and these two, together with Larry's secretary, Irene Bernhardt, constituted the nucleus of Bell Aircraft Corporation.

Only Whitman now is active, serving as the Company's First Vice President and General Manager of its Niagara Frontier Division. *He and Walter Yates of Buffalo are the only remaining members of the original Board of Directors.*



In July 1935, Larry formed a Company whose capitalization was to be \$500,000, with a mandatory cash minimum set at \$150,000. Preferred stock was offered at \$100 per share with one share of common as a bonus. He, Ray Whitman, Bob Woods, and a small group of other associates, by scraping together everything they had, raised \$90,000. The remaining \$60,000 was to become quite a nut to crack.



Bell asked subscriptions with the understanding that no subscription was to be binding unless the entire starting minimum of \$150,000 was raised by September 1st. Larry had no plant, no equipment, no money, and, beyond that, no product and no business on the books. Despite his own dynamic sales personality, he had a difficult time trying to reach the target sum of \$150,000 in the depression-ridden economy of 1935.

I think, without detracting from the part played by other Buffalo citizens in lending Larry financial support, it is only fair to say that two men really triggered the public's acceptance of Larry's new Company and made it possible for him to provide the necessary money within the allotted time. The two men who made substantial investments were Sheldon Weed and Charles A. Criqui, now both dead. Interestingly enough, each invested for a different reason.



Several years previously when Larry had asked him to help underwrite an air show for \$500, Weed put up the money and

mentally wrote it off as a loss. The show, to the surprise of everyone except Larry, broke even and he returned Mr. Weed's \$500.



Criqui, once a plumber and steam fitter, progressed to the Presidency of the famous Sterling Engine Company. When Larry asked him why he decided to purchase stock in the Company, Criqui unhesitatingly replied: "You've got the same kind of spark I used to have at your age."



Of the \$150,000, the sum of \$35,000 was allocated for tools and equipment. Larry, always a shrewd trader, bought \$17,000 worth of tools from "Consolidated" and offered Major Fleet \$1 for everything "Consolidated" decided was uneconomical to move to the West Coast and would abandon. Fleet agreed and for \$1 Bell secured a vast collection of miscellaneous items, machinery, benches, coat hangers, and just plain junk. What he couldn't use of this he resold for \$17,000, thereby coming out with his original investment and a neat profit.



Larry had a hard and fast rule for office equipment. No desk was to cost over \$5, no chair over \$2. That kind of thrift was necessary. Getting the Company started was a tough job, keeping it going was another.



The first five years of Bell Aircraft Corporation took all the drive and determination that Larry Bell could pour into it and possibly took more than he should have poured into it, because undoubtedly it was during that period that he undermined his health, an undermining that led to his death at the untimely age of 62.



Government orders were extremely scarce and competition was keen with older, more established companies like Martin, Curtiss, Boeing, Douglas, and Consolidated. Using sub-contract work on *PBY* wings for "Consolidated" as the bread and butter, Bell's

first airplane, the twin-engine, pusher type *Airacuda*, came into being. The *Airacuda* embodied a typical Bell idea; first, choose your fire power and then build an airplane of maximum combat performance around it. Two 37 mm cannons and four 50 caliber machine guns were chosen and, on May 12, 1936, a contract for this new and highly experimental plane was awarded to "Bell Aircraft."



Thirteen *Airacudas* were made, the usual service test quantity in those days. In September 1937, when it flew, it was the fastest airplane the U.S. Army possessed, with a speed of 300 mph. This plane probably would have had wider use but it was believed to be too far ahead of its time. Yet, work on the *Airacuda* was a springboard for things to come. As a matter of fact, it almost was superseded before it flew, and by another Bell plane.



The U.S. Army Air Corps invited Larry and other companies, in 1936, to enter a design competition for the development of a new single engine fighter. Larry submitted two designs and after two weeks of study at Wright Field, the Air Corps announced the results of the competition. Bell's models finished one, two.



The *P-39 Airacobra*, as this airplane was known, incorporated many innovations such as rear engine installation, a 37 mm cannon firing through the hollow hub of the propeller, greater pilot visibility, and a tricycle landing gear. The *Airacobra* was the first modern airplane to use this type of landing gear which, of course, now has become a standard configuration.



Fred Schoellkopf, who was one of Bell's first employes and who now is President of Niagara Share Corporation and a Bell director, actually participated in the invention known as an anti-shimmy dampener which kept the nose wheel steady during rapid taxiing and take-off and which was used on practically all tricycle type landing gear airplanes through the Second World War and later.

But the most radical *Airacobra* innovation never was accepted by the Air Corps, although it did earn Larry a 1954 award from the American Rocket Society. He had actually proposed back in 1937, a rocket assist for the *Airacobra*, to help rapid take-offs on short runways. Years later, of course, the so-called *Jato* assist take-off equipment appeared on many airplanes.



After winning the design competition, however, only another service test quantity was ordered. Nothing daunted, Larry Bell sold the first production quantity of *Airacobras* to the French, an order that subsequently was transferred to the British, in 1940, after the fall of France. Only then did the United States order the *P-39* in substantial numbers.



The *Airacobra*, like its famous Buffalo neighbor, the *Curtiss P-40*, was the victim of unfortunate timing. In the late '30's, it was ahead of its time, but by 1942, it began to approach obsolescence, although more than 13,000 *Airacobras* were built and delivered to the Army Air Forces and Allied countries before its production and that of its improved successor, the *P-63 Kingcobra*, ended on *V-E Day* in 1945.



Meanwhile, other developments almost as startling as the technical developments were going on from 1935 to 1939. In its first five years, Larry Bell's struggling Company had achieved a total sales volume of slightly more than \$7,000,000. By *V-E Day*, five years later, when fighter production ceased, this sales total had swelled to a billion dollars.



The small group of 56 people who constituted Bell Aircraft Corporation at the end of 1935 sky rocketed to a total of 36,000 employees in the Buffalo area by 1943, an additional 30,000 in the Georgia Division a year later, and 2,700 in Vermont. A new as-

sembly plant had been built at the Niagara Falls Airport which incorporated all Larry's dreams of what an airplane plant should be. Problems came and went every day that made the difficulties of 1935 seem but a small patch of fog. More than 1,700 people a week were being hired week after week after week, and 1,100 a week were quitting or being drafted.



More than 50 percent of the direct labor in the Buffalo factory were women, most of whom never had seen the inside of a factory before. Even then, it was necessary to concoct special plans like the so-called "Victory Shift," whereby lawyers and housewives, bankers and merchants, doctors and teachers worked at their own business as normally as possible and then worked a half shift, four hours, at one of the Bell plants.



While "Bell" had only a net worth of \$1,000,000, it was necessary to establish a so-called *V-Loan* credit of \$60,000,000, guaranteed by the U.S. Government, of course. But when the Company was unable to hire clerks fast enough to process government vouchers for reimbursement of its production efforts, "Bell" defaulted on its *V-Loan* covenant within 30 days of the time the credit was established.



Other things were going on in other places to demand a great share of Larry Bell's time. He always enjoyed a remarkably huge capacity for taking on new projects, digesting the pertinent details immediately. He needed this ability. On September 5, 1941, General Henry H. (Hap) Arnold summoned Larry to Washington to tell him his Company had been selected to design and build a high performance fighter to be powered by two General Electric engines, versions of the radically new jet propulsion engines developed by a British inventor, Group Capt. Frank Whittle. Larry plunged into the new project which was to evolve into the *XP-59*, this Country's first jet powered airplane.



The work was carried on in the old Ford Motor Company plant in Buffalo, now occupied by Trico. The project was scheduled and departmentalized carefully, so that very few people saw the final airplane and many employes in many departments of this so-called experimental plant never knew until long afterwards the final vehicle for which they were building parts and assemblies.

The first *P-59* was shipped secretly to Muroc Dry Lake in the Mojave Desert of California, where it was first flown by "Bell's" chief test pilot, Bob Stanley, in October 1942, only 13 months after Larry's first conference with General Arnold. Larry, of course, was at Muroc for this epoch-making flight.

General Arnold later said there never was a plane subjected to greater security and it probably was the best kept secret of the Second World War, with the exception of the atom bomb.

Only seven days after Pearl Harbor, Larry received another significant telephone call. This was from Major General Oliver P. Echols, Deputy Chief of Staff. General Echols asked Larry how he would like to build *B-29s*. When Larry asked what a *B-29* was, General Echols replied: "a sort of grown up *B-17*, only bigger and better."

Larry went to Washington to receive a contract to build *B-29s* at a yet unbuild plant in Marietta, Georgia. Nine million cubic yards of earth were moved before construction was finished on the huge \$50,000,000 plant in the hills of north central Georgia. Almost two years to the day after Larry first heard he was to build *B-29s*, the first Bell-built Superfortress was delivered to the Army Air Forces.

By 1944, when thousands of persons were on the Georgia Division payroll, *B-29s* were rolling off the production line at the rate of two every day, seven days a week. This plant had 45 acres of floor space on one floor alone.

The building and tooling of this facility, its transformation into an efficient production unit, the training of unskilled southern workers, the incorporation of thousands of engineering changes on the production line, the completion of 663 *B-29s*, each of which was tested and then flown directly to a war theater without a single operational accident, was one of the truly great industrial miracles of the Second World War. Particularly was this so when it is considered that the Georgia operation was, at least at its outset, a sort of side line to Larry's main business of building fighter planes in Buffalo.

And, while this was going on in Western New York and Marietta, Georgia, a nucleus of Buffalo people moved to Burlington, Vermont, where "Bell" established its Ordnance Division. Here were built several hundred thousands of the hand-held airplane gun mounts invented by "Bell" and which were used as the chief source of defense for American bombers flying over enemy territory in the European and Pacific theaters.

Incidentally and interestingly, this gun mount was based upon a hydraulic recoil dampener first developed so the early "Bell" *Airacuda* could carry 50 caliber machine guns and have much of the recoil absorbed by the mechanism rather than the gunner. This recoil dampening device was manufactured by Houdaille under a "Bell" license for many years, and only ceased to be an important part of our arsenal of defense when electronic automatic fire control was perfected after the Second World War.

Directing the growth of such an enterprise in three widely separated States and administering its many facets and ramifications was a large task, but Larry appeared to take it and all its attendant problems in stride. Looking back on those days he once said: "It seemed as if I was always on the run."

With *V-E* Day in Europe, fighter production ceased in Buffalo and with *V-J* Day in the Pacific, operations at the "Bell" bomber

plant at Marietta, Georgia, came to a close. The only active "Bell" remnant there today is Larry Bell Park, maintained by the City of Marietta.



The Ordnance Division in Burlington continued as a subcontractor to various manufacturers for two years but, by 1947, it became apparent that the Burlington operation could not justify a separate existence and it was returned to the Niagara Frontier. The Vermont plant was sold.



Thus ended the first half of Larry Bell's career as President of Bell Aircraft Corporation. Perhaps it best could be summed up, though over-simplified, by saying this was the critical and formative period of the Company, a Company which had demonstrated its ability to accept tremendous challenges, undergo fantastic expansion, and then recede to a relatively small organization of 1,800 persons and one plant on the Niagara Falls Airport.



Probably, to many outsiders it seemed that Larry Bell's relatively brief tenure in the sun as head of his own Company was approaching an end. Government business was at a standstill, new orders for aircraft almost were non-existent, the prairies and plains of Texas and Arizona were covered with idle airplanes as far as the eye could see.



From a high peak of \$317,000,000 in 1944, "Bell's" business shrank to \$11,000,000 in 1946. Earnings disappeared and substantial amounts of red ink were scattered upon the Company's financial statements.



But those who had such doubts didn't realize the true caliber of the man they were doubting. Back in 1941, when Europe's Second World War was about to engulf America and Larry Bell faced fighter plane production in numbers such as he never had dreamed of, he had the genius to pause for a moment in his ex-

pansion plans to sit down with a young Pennsylvania inventor by the name of Arthur M. Young.



Young had devoted 15 years to research in the rotary wing field and demonstrated to Larry a model helicopter which he could fly with electric controls. Larry immediately envisioned an opportunity that would have to be delayed by the war but that someday might yield a large dividend.



He hired Young, set him and a small staff up in a garage rented in a suburb of Buffalo, completely divorced from the Company's hectic all-out war efforts. Larry always liked the small helicopter shop because he said it reminded him of the early days of the Martin Company in Los Angeles, where a handful of dedicated men worked long hours at any task that needed to be done to forge an inventor's dream into a flying reality.



In 18 months, the first "Bell" helicopter, known as *Model 30*, made its first flights. The "Bell" helicopter wasn't quite ready when the Second World War was over, but in September of 1945, Larry announced that his Company definitely would enter the post-war helicopter field.



This was a bold step for an aircraft President to take in the face of a helicopter not even licensed. But bold steps were needed and Larry knew precisely what he was doing.



Barely six months later, March 8, 1946, a "Bell" helicopter was awarded the Civil Aeronautics Administration designation "NC-117" and became the world's first commercially licensed helicopter.



This development did not come cheaply. Almost \$12,000,000 were invested before the first Bell helicopter was sold commercially or to the military.

With only 436,000 shares of stock outstanding at a per share price of around 18, and with substantial amounts of cash in the bank, "Bell Aircraft" was an attractive target for selfish men who had neither the ability nor the capacity to share Larry Bell's dream and were bent only upon senseless liquidation in order to capture the Company's cash assets.

"Bell" was not alone among the aviation industry in this predicament, but that was small comfort to Larry Bell who, in April 1947, saw a determined effort by a New York financial group to seize control of Bell Aircraft Corporation and to undo much that Larry had worked for and accomplished, and even much more that he intended to accomplish.

Fortunately, this onslaught was beaten off successfully, and Larry was free to continue the research programs in which he so vitally was interested.

By this time, his development program included not only helicopters but already a tiny beginning had been made in the new field of *guided missiles*. Development of the German *V-1* and *V-2* bombardment missiles late in the Second World War and capture of some of the German scientists responsible for these two weapons, had begun to stimulate America's aviation industry. Larry was one of the first to foresee the swiftness with which post-war technological developments could create an essentially new industry.

In those lean post-war years "Bell Aircraft" started to recruit and to organize a technical team that began to delve into the mysteries of rocket motors, electronic guidance, and all the wide scientific and technical ramifications that were necessary in order to conceive, design, and produce a guided missile weapons system.

At the same time, "Bell Aircraft" had been working diligently on another dream of Larry's, the *Bell X-1* research airplane, which

was the first airplane in the world specifically designed to penetrate the mysterious and awe-inspiring sonic barrier or, in other words, to fly faster than the speed of sound.

It offered a tremendous challenge to everyone concerned and had the kind of problems for which there was no precedent nor reference. As a matter of fact, there were sufficient skeptics so that at several points after actual building started, the whole project might have been abandoned or shelved had it not been for Larry's unwavering conviction the *X-1* would succeed.

While Larry Bell was not an aeronautical engineer in the formal sense of the word, nor was he a production genius of the type of William Knudsen, yet he, nevertheless, had that rare quality of leadership which inspires dreamers to dream and hard-headed mechanics to convert those dreams into hardware.

On October 14, 1947, then Captain Charles E. Yeager, U.S. Air Force test pilot, flew the *Bell X-1* at a speed faster than the speed of sound, the first time in the world this had been accomplished. Thus, with this flight over the same dry lake at Muroc, California, where the Bell-made *P-59* jet first had flown, a second vivid chapter in world aviation history was written by a Company scarcely more than ten years old.

Today, these two planes of Larry Bell's, the *P-59* and the rocket-powered *X-1*, are on display in the Smithsonian Institution in Washington.

When General Hoyt S. Vandenberg, the Chief of Staff of the U.S. Air Force, presented the *X-1* to the "Smithsonian" in official ceremonies, he said, in part: "I consider the *X-1* the most convincing evidence of our ability to discover and control the forces of nature since the original Wright plane. The *X-1* was

the sturdiest airplane ever built . . . and even after it was built many influential persons urged abandonment of the project because they considered supersonic flight impossible.

“Its design was a stroke of genius for it has met every requirement and every test without a single modification.”

Not only did the X-1 do everything Larry thought it could but it did it without mishap or accident, just exactly as it came off the drawing board. It is possibly the only modern-day airplane which completed its mission *without one single major or minor modification.*

Larry was not content with the tremendous achievement of the X-1. A second series of X-1 rocket-powered research airplanes already was under way and two other types were on the drawing board. One was the X-5, the first plane able to vary the sweep of its wings in flight, and the second was the *Bell X-2*, the first airplane ever designed to explore the so-called thermal or heat barrier.

The design speed of the X-2 was to be so great and the temperatures it would encounter so high that conventional aluminum alloys would not retain their physical properties under these conditions. So its fuselage was built of *K-monel*, a nickel alloy, and its wing surfaces of stainless steel. This was the first *K-monel* sheet metal ever fabricated, and as the X-2 was being built the President of International Nickel Company, brought his top laboratory people to “Bell” to observe the production methods.

Before Christmas of 1953, the X-1A was flown by Yeager 1650 mph and another Air Force pilot, Major Arthur Murray, took this plane to 90,000 feet. This, in a way, set the stage for the performances of the X-2. In the Summer of 1956, Lt. Colonel Frank K. Everest, Jr. flew the X-2 at more than 1900 mph. Two months

later, U.S. Air Force Captain Iven Kincheloe took the same plane to a hitherto unheard of height of 126,200 feet.

In September of 1956, Captain Milburn Apt flew the airplane still faster than Colonel Everest, 2148 mph, but tragically died in the X-2's final flight.

Thus, Larry Bell, just eleven years after his Second World War fighter and bomber production had been terminated and left the Company literally with nothing to do, watched three of his airplanes in succession fly faster and higher than any other manned airplanes in the world as of this date.

But these airplanes were designed not just to set speed or altitude records; each was a flying laboratory investigating new horizons of aviation. The data collected from the many flights of these “Bell” research airplanes have been applied to modern fighters and bombers and planes and missiles still to come. The X-1 opened the door to supersonic flight, the X-2 crossed the threshold of manned space travel by nosing into the thermal barrier.

In the midst of all this effort to develop new products to revitalize the Company, a long and bitter strike of production workers exploded in June 1949, and lasted 19 weeks.

A severe automobile accident during this period, and probably attributable at least in part to the strike's effect upon nerves and physical condition, further aggravated Larry Bell's health. Also, the strike itself deeply hurt the man who had worked so hard to build, and then to rebuild his Company to provide jobs for those he felt truly were his people.

Meanwhile, Larry Bell's engineers were learning a lot of things applicable to missiles from the Bell research aircraft which almost

can be labeled as inhabited guided missiles. From association with the X-2's power plant "Bell" became interested in rocket propulsion and the Company now is a major source of rocket engines.



On November 1, 1957, the *Bell GAM-63 Rascal* guided missile was activated by the Strategic Air Command into an operational squadron.



The *Rascal* has been nicknamed "Crew Saver" because it enables a bomber crew to deliver a nuclear or hydrogen war head against a target many miles away without exposing the bomber and its crew to highly concentrated local defenses.



His Company had the entire weapons system management of this missile, including the design, development, and production of the airframe, rocket power plant, the guidance system, ground handling and launching equipment, and even the assignment to train Air Force personnel.



Larry always held human life in high regard and this ranged from a supersonic guided missile which can protect the lives of pilots in the air, to the "Bell" helicopters whose record for saving lives is matched by no other vehicle in the world.



In his lifetime, he saw the individual inventor and mechanic outgrown. He saw an industry that once depended exclusively upon the aeronautical engineer seek out the scientist specializing in electronics, metallurgy, physics, thermodynamics, fluid mechanics, space medicine, and many other facets of advanced technology.



"The next decade of aviation," he said, shortly before his death, "can easily bring developments far exceeding even the most important progress achieved in the first half century of powered flight." Already, this prophecy is coming into actuality.

Larry, of course, was thinking of the challenges which rise far beyond the farthest penetration of the X-2 into the upper atmosphere. Yet, at the same time, he also was considering the still unfulfilled promise of a vehicle whose spectacular advancement in little more than 10 years already had earned for it a solid role in air travel, the helicopter.



Larry used many vivid phrases when he talked of helicopters. I can remember him describing flight in a helicopter as: "looking at the world with the lid off." When he announced at the end of the Second World War that his Company would gear itself to build 500 helicopters, there were, frankly, a number of raised eyebrows.



But this pronouncement was made for reasons best known to Larry. He needed something to retain his key people, his executives, engineers and production men, at a time when contract cancellations meant the separation of thousands of employees. There were some research jobs and other odds and ends, but he was determined to save a nucleus of his more valuable men. In addition, Larry's faith in the helicopter was firm, immeasurable.



It took a little longer to reach that goal of 500 helicopters than Larry originally conceived, but time proved him to be just as prophetic in this concern as in so many others.



The performance of helicopters in Korea was the great spur the rotary wing industry needed. And so, typically, Larry was on the spot to witness the almost miraculous achievements of the helicopters operated by U.S. Army, Air Force, Navy, and Marine pilots in a war that never was called a war.



In 1953, he was in the combat zone of Korea, the only aircraft President to tour the front lines. The fact that helicopters built by his Company rescued or evacuated almost 20,000 wounded United

Nations troops kindled a deep and humble pride in him. That Larry Bell, a self-styled munitions maker, also could be so deeply concerned with a machine like the helicopter, a machine so unequivocally dedicated to missions of mercy, was one of the true measures of the man.

Another facet of his eternal quest to probe beyond the horizon was his concern with automatic flight. In the same period when he was nurturing the helicopter in a suburban garage, he was directing his research engineers in the study of remote control aircraft. His primary motive at that time was to make possible a more searching evaluation of high speed airplanes without endangering the lives of test pilots. But the work eventually led to devices to make piloted aircraft truly "all weather capable."

In typical "Bell" tradition, Larry's engineers had a Bell *Airacomet* flying all over the skies of Western New York in 1944 and 1945 with a so-called "safety pilot" aboard, but with the plane controlled from either the ground or a "mother" airplane. Since that time various other types of aircraft have been operated by this remote control system up to and including *B-17s*.

Out of this and subsequent programs came a long-needed safety device announced early in 1955, the Bell-developed automatic, all-weather, aircraft landing system. With this system, a dozen types of airplanes have taken off and landed on airports and, last fall, it conclusively demonstrated its ability to land jet aircraft on the decks of aircraft carriers at sea with the pilot's hands completely off the plane's controls.

Another outgrowth of this work was an automatic landing system for landing guided missiles after tests, thus saving millions of dollars as well as verifying valuable technical information.

It is an almost endless chore to chronicle the many aircraft innovations Larry conceived or inspired! Right now, "Bell" is working on an operational type jet-powered vertical take-off and landing airplane, funded jointly by the Navy and the Air Force. Its beginnings, however, date back to 1953 when Larry authorized Company funds for a project which was to lead to the Country's first jet *VTOL*.

This was a sort of ugly duckling made up of a glider fuselage, the wings of a light plane and the skid landing gear of a helicopter, but it proved conclusively a theory and resulted in the *X-14*, a more advanced *VTOL* sponsored by the Air Force.

Down in Fort Worth, Texas, where "Bell" moved all its helicopter operations in 1951, the flight testing of another approach to *VTOL* is going on. This is the *XV-3 convertiplane*, which marries the best features of a fixed-wing airplane and a helicopter. Its rotors or propellers lift and land the *XV-3* like a helicopter and then tilt forward to power the machine like a conventional airplane.

With these and other advanced projects going forward it should be apparent that "Bell Aircraft," ever spurred by the personality and dreams of Larry Bell the visionary, now deeply is involved in the missile age, in space flight. The Company actively is at work on space projects including a manned hypersonic glide bomber.

All of the things that Larry Bell did or had done have not escaped the attention of a grateful Nation and a grateful world. His honors were many and include, to name a few: the Collier Trophy, the Guggenheim Medal, a Presidential Citation, the U.S. Air Force's Highest Civilian Award, the French Legion of Honor, Honorary degrees from Clarkson Tech and Hobart College, the Air Force Association Citation of Honor, the Chancellor's Medal of the University of Buffalo and, dated the day he died, the Commander of the Order of Merit of the Republic of Italy.

Because his Company took cognizance of the problems of the physically handicapped and traditionally has had about 20 per cent of its jobs filled by disabled veterans and other handicapped workers, Larry received citations in this field from: the American Legion, Veterans of Foreign Wars, Disabled American Veterans, and other organizations.



It probably isn't generally known, but he was a founder and the first President of the Society for the Rehabilitation of the Facially Disfigured which last year memorialized his devotion, by establishing as part of a million dollar grant, the Lawrence D. Bell Chair in Plastic Surgery in the New York University-Bellvue Medical Center. This is the first endowment of such a chair in the world.



At the Medical School of the University of Buffalo, there also is the Lawrence D. Bell Chair in cardiovascular research, now in its third year of researching heart disease.



While "Bell Aircraft" has developed so many products of its own, it also has made significant contributions to the products of other contractors.



*Nike* guided missiles, which protect the Niagara Frontier as well as other communities, are powered by Bell rocket engines. Electronic and servo mechanical systems designed and built here are integral parts of front line military and commercial aircraft and missiles of many kinds.



Larry Bell's post-war ambition, along with the development of helicopters and the development of supersonic airplanes and guided missiles, was to diversify "Bell Aircraft's" activities into so-called non-defense and non-aviation fields in order to assure a more stable economy for the Company, its stockholders, and its employees.

By the time the X-2 made its historic flights late in 1956, "Bell Aircraft" already owned The W. J. Schoenberger Company of Cleveland, Ohio, manufacturers of valves and fittings for the gas appliance industry; the Wheelabrator Corporation of Mishawaka, Indiana, manufacturers of industrial equipment including abrasive devices and dust and fume control installations; Hydraulic Research and Manufacturing Company of Burbank, California and Bell Automation Corporation of Rochester, New York. Bell Helicopter Corporation had been established in Fort Worth, Texas, in a new building planned and built by Larry Bell.



Since then, two other companies have been acquired—Lake Erie Machinery Corporation of Buffalo, and Birma Manufacturing Company of Buffalo and Greenfield, Indiana.



That same year, 1956, saw more than \$58 million worth of Bell helicopters sold, a fitting climax to Larry Bell's plans for a helicopter industry separate and independent from the so-called aircraft industry.



"Bell Aircraft" has had a steady, sound, and remarkable financial growth. From an initial investment of \$500,000, the Company has increased its net worth to \$42,000,000. Sales from 1935 through 1957 have amounted to \$2,260,000,000.



Earnings partly have been reinvested in plants, machinery, equipment and other assets for the purpose of maintaining a leading position in the industry and for planned expansions and diversifications. At the same time, the stockholders of the Corporation have realized a steady increase in their investment and have received cash dividends totalling \$23,081,000.



Of major importance to the stability and economy of the communities in which it has performed work, "Bell Aircraft" has paid some \$1,080,000,000 in wages and salaries.