



Victor Emanuel
Chairman of the Board
Avco Corporation

Mr. Victor Emanuel, chairman of the board of Avco Corporation, recently welcomed Avco stockholders to an annual business meeting held at the Wilmington Research Center. In describing the Center to the more than 800 shareholders in attendance, Mr. Emanuel said:

"The place of our meeting is in many respects symbolic of the great changes occurring in the world today, which will have profound influence upon our individual lives, the future of this company and many other companies, and—far more important than anything else—the survival of the free way of life.

"This unique property, known as the Avco Research Center, is devoted to basic research in the major scientific disciplines as well as applied research and development related to specific objectives. The Center includes specialized laboratories, support facilities and equipment which are unexcelled. . . .

"The story of how this facility came into being goes back to 1954, when your company organized a small group of eminent scientists to help in one of the most difficult and critically important projects undertaken

in this country since the development of the atom bomb in World War II. The project, at that time shrouded in secrecy, was the development of the intercontinental ballistic missile. . . .

"The task facing these scientists was a monumental one—how could the ICBM nose cone, traveling at a speed of perhaps 18,000 miles per hour, and generating heat greater than that on the surface of the sun, survive re-entry without burning up as a meteor does?

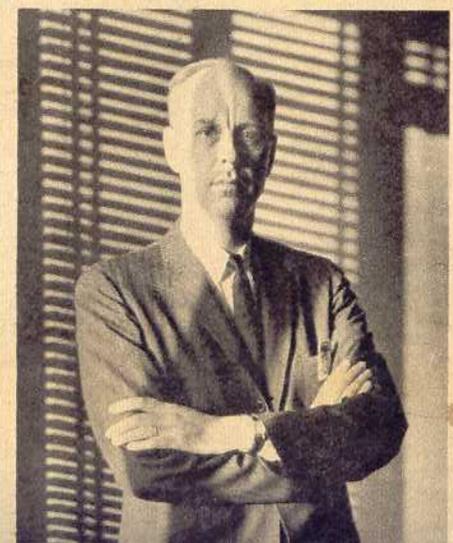
"An epochal achievement was made by Avco scientists in using shock-tube experiments and other laboratory techniques for solving the re-entry problem without the necessity of test firing a complete missile. What they discovered constituted a major technological breakthrough, saving perhaps two years and many millions of dollars for our country in its race with Russia. . . ."



Kendrick R. Wilson, Jr.
President
Avco Corporation



Dr. Jack A. Kyger
Vice-President
Research and Advanced Development Division



Dr. Charles J. Burton
Vice-President
Research and Advanced Development Division



Space-Age Research at Avco Center Could Sp

By JUAN CAMERON
Herald Staff Reporter

WILMINGTON—No better place to view the impact of research and development on American business is available than at the Avco Research Center here.

This sprawling, futuristic \$23 million honeycomb of "electronic copy desks," noisy environmental test chambers, quiet conference rooms, electronic computing centers, equipment-jammed laboratories is the intended spawning ground—not for products—but for whole new industries.

Research for the Space Age dominates the work of the 2300 men and women working in this Center, perhaps the state and region's most highly organized, most definitive research and development activity.

Missile Programs

Development of a nose cone for the intercontinental ballistic missile Titan and the second-generation Minuteman ICBM that can withstand the jarring impact and metal vaporizing heat as the missile re-enters the earth's atmosphere is the biggest project here.

But the planning behind the Center goes deeper than that.

As conceived by Avco Chairman Victor Emanuel four years ago, the research and development division was to launch the company as a leader in the Space Age and build up its non-military business in areas requiring technical competence.

The company has corralled dozens of top-drawer scientists to work in the new Center that is spread across the entire field of scientific research and development.

Investment in Research

Division President James R. Kerr helped organize the division four years ago. Mr. Kerr, who also runs the company's Lycoming engine division in Connecticut, is a former Air Force officer with extensive procurement and production experience with Avco and the Air Materiel Command. Technical Director Dr. Jack A. Kyger is a physicist formerly with Admiral Hyman Rickover in the Navy's nuclear submarine program.

From the defense activities at Wilmington are expected to come products for production by Avco's other divisions engaged in electronics and communications manufacture, in gas turbine and missile components, in air conditioning and heating equipment; farm machinery, aircraft, and missile structures.

The company has said that in time it hopes to net \$3 to \$5 in profits for every dollar invested in research.

Physicist and Chairman Meet

This new emphasis on research and development was responsible in large part for the corporation's recent change of name that struck the word "manufacturing" from the old Avco Manufacturing Corporation.

During 1955 Avco Chairman Emanuel (then president) had met physicist Dr. Arthur Kantrowitz at Cornell and heard his ideas for simulating in a laboratory the conditions a ballistic missile would encounter as it entered the earth's atmosphere from outer space.

Mr. Emanuel's imagination and long experience in aviation (Avco is a derivative of the company's early name, Aviation Corporation, that among other interest had sizeable holdings in American Airlines, Pan-American Airways and Consolidated-Vultee in the 1930's) enabled him to see in the Cornell physicist's work with the shock tube a chance to establish the corporation in the mushrooming missile and space field.

The eventual result: the Avco Research and Advanced Development Division that today operates the Wilmington facility.

Industrial Goals

Patterned after the Bell System and du Pont laboratories, the Avco Research Center strives to maintain the atmosphere found on the university campus and yet, as one company official puts it, keep the "definitive goals" of industry.

Since its inception and early success in getting a \$111 million contract to develop the nose cone of the Titan ICBM, the division has specialized in applied research keyed to development of advanced systems for both industrial and military use.

Dr. Kantrowitz's Everett laboratory, concentrating in pure research in problems of high-temperature gas dynamics, man-carrying earth satellites, magnetohydrodynamics, has been set up as a separate operating division of the corporation, known as the Avco Research Laboratory.

Laboratory Testing

The distinct role of the Wilmington division includes carrying on research of its own—especially in materials—as well as programs to develop, improve and test ideas fed in by the research effort under Dr. Kantrowitz at Everett and by the research staffs of other Avco divisions.

At Wilmington, for instance, nose cones are subjected to temperatures ranging from 100 degrees below zero to 25,000 degrees Fahrenheit. They and their instrument packages are tested for their ability to withstand fungus growth, shock, vibration, the dust and sand blasting of a desert launching.



Spawn New Industries

In an electronic processing center, data telemetered from the nose cones of missiles fired at Cape Canaveral, Fla., is processed to find out how the nose cone package reacts under live firing conditions.

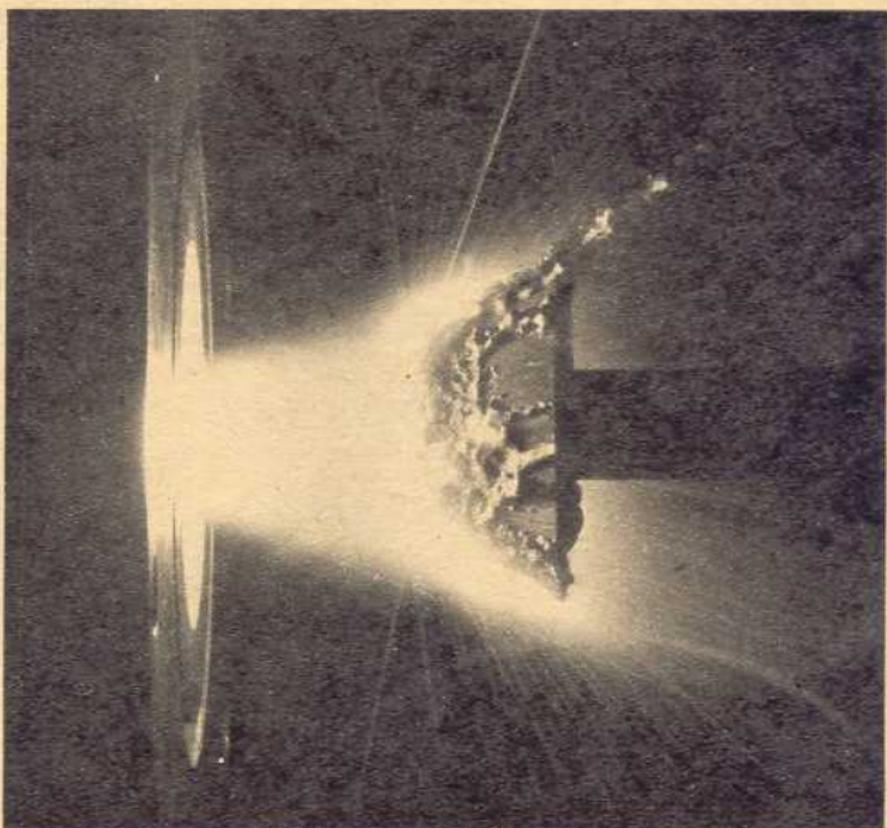
The by-products of the huge research efforts with commercial application beyond defense are expected to be numerous.

Leading R & D Company

At one time 30 to 40 research projects ranging from design of advanced instrumentation, solid-state physics experiments to develop better rocket materials, or mechanical studies to improve existing shock-testing equipment may be under way.

The impact of this research and development effort, the fourth largest in the state, on a company that does slightly more than 62 per cent of its work in the defense field—although too early to measure yet—will undoubtedly be great.

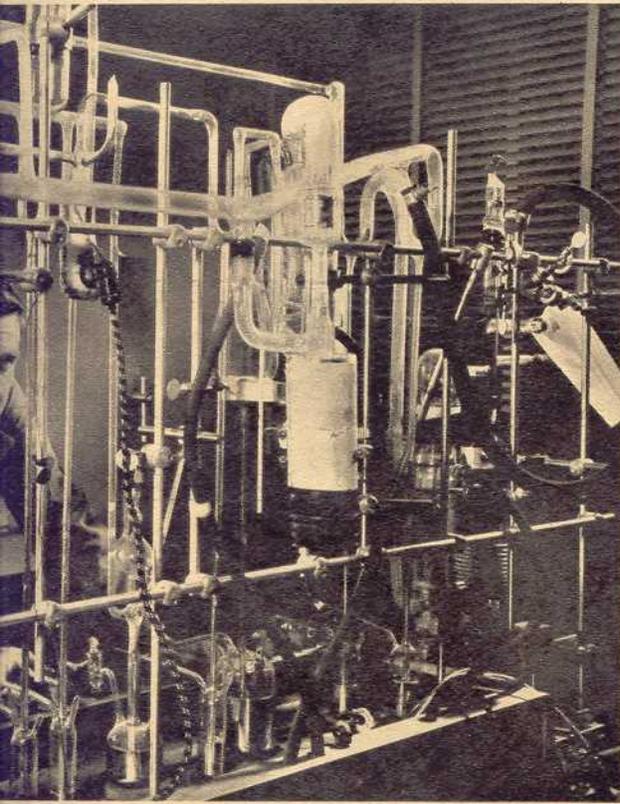
Given rapidly developing scientific knowledge, the high quality and extent of this industrial research undertaking Avco's aim of "creating whole new industries" through its Massachusetts facilities holds bright promise of being achieved.



RE-ENTRY SEARING

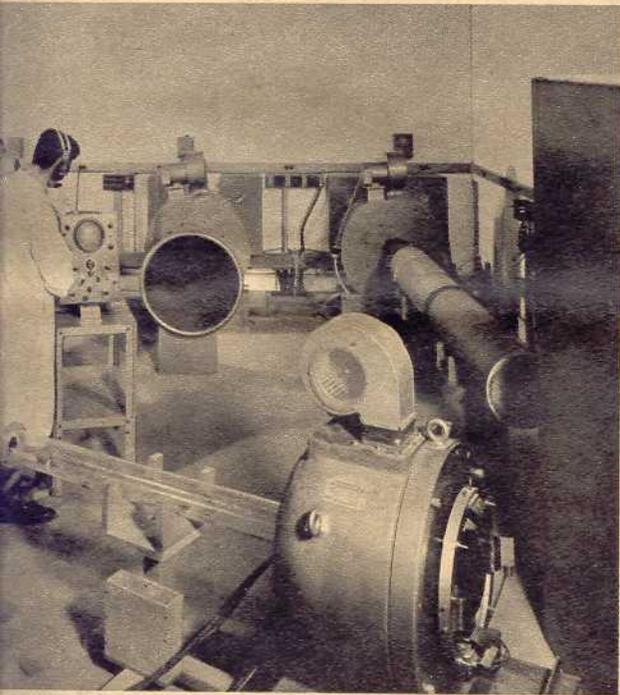
Jet heat blast of more than 20,000 degrees flares over surface of an experimental nose cone shape in an Avco laboratory. Avco-developed electric air arcs reproduce the terrific heat of re-entry from outer space into the earth's atmosphere—a hazard which a nose cone must survive.

AVCO AND THE SPACE AGE



LABORATORY TEST

laboratory a complicated apparatus analyzes the gas con-
various projects under development at the Center.



NOISE HEADQUARTERS

ing roar of rocket engines can damage sensitive mis-
be made to ensure their protection. Such tests are
ned acoustic noise chamber where noise factors are
d levels of sound.

At Wilmington, Mass., the ultramodern Avco Research Center houses not only Avco's Research and Advanced Development Division, it harbors an original concept of Space Age research and engineering.

In 1954—long before the Soviet Sputnik's bleeps echoed from outer space—Avco Corporation, the division's parent company, anticipated the need for a space-minded approach to the future and laid plans for company activities to meet advanced research requirements.

This general concept, envisioned by Chairman Victor Emanuel, included a plan to create a new Avco division to concentrate on difficult and novel areas of science and engineering which could lead to the development of an entirely new industrial effort.

As the soundest approach to future prospects, the corporation invited a group of the nation's leading scientists to discuss new projects and to recommend the most promising areas for research.

Planning by Scientists

In the spring of 1954, these conferences of science and industry resulted in the formation of an Avco Committee on Advanced Scientific Research. The distinguished members of this committee—all with records of notable achievement in their fields—then were asked to draw up a master plan for Avco's entry into Space Age research.

This was a trail-blazing approach to the blueprinting of an industrial facility. And, stimulated by the support of a company which had been the third largest producer of materiel during World War II, the scientists enthusiastically began to discuss plans for research to meet the challenges of the post-war world.

After months of consultation and study, the plan emerged for Avco's Research and Advanced Development Division.

Ultimately, it was decided that this newest Avco corporate enterprise would be housed in the most modern laboratories obtainable, that these laboratories would contain the most advanced equipment known as a further incentive to the free development of creative minds, that architecture would contribute to an atmosphere in which men and women of science could become fruitfully absorbed in problems of advanced research.

News Breaks in Everett

Under supervision of a blue-ribbon team of scientific talent, the new division was established in temporary quarters at Avco's Lycoming Division in Stratford, Conn.

Already at work at Everett, Mass., was the Avco Research Laboratory staff under the directorship of Dr. Arthur Kantrowitz, formerly an outstanding faculty member of Cornell University's Graduate School of Aeronautical Engineering and a noted specialist in high-temperature gas dynamics.

From Everett came the first hint of the important mission of Avco's newest enterprise. The announcement that missile flight problems were being simulated at speeds exceeding 18,000 miles per hour at the Everett laboratory became a top science news story across the country.

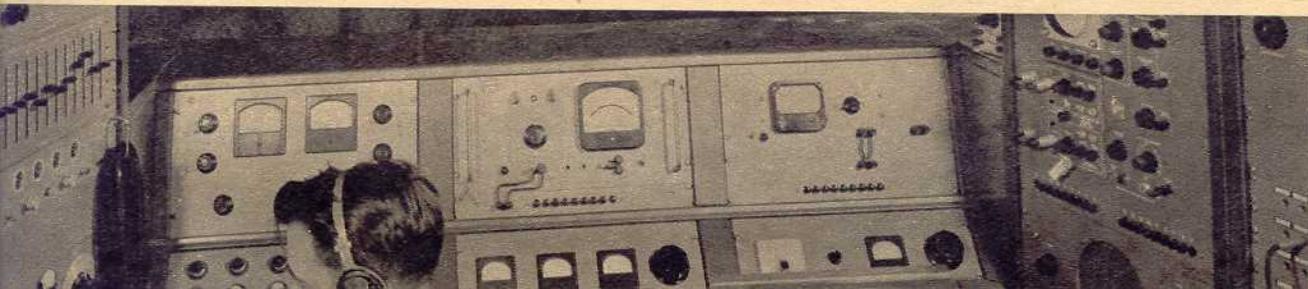
At this time, however, because of defense security, details of the nature of Avco's role in missile research could not be revealed.

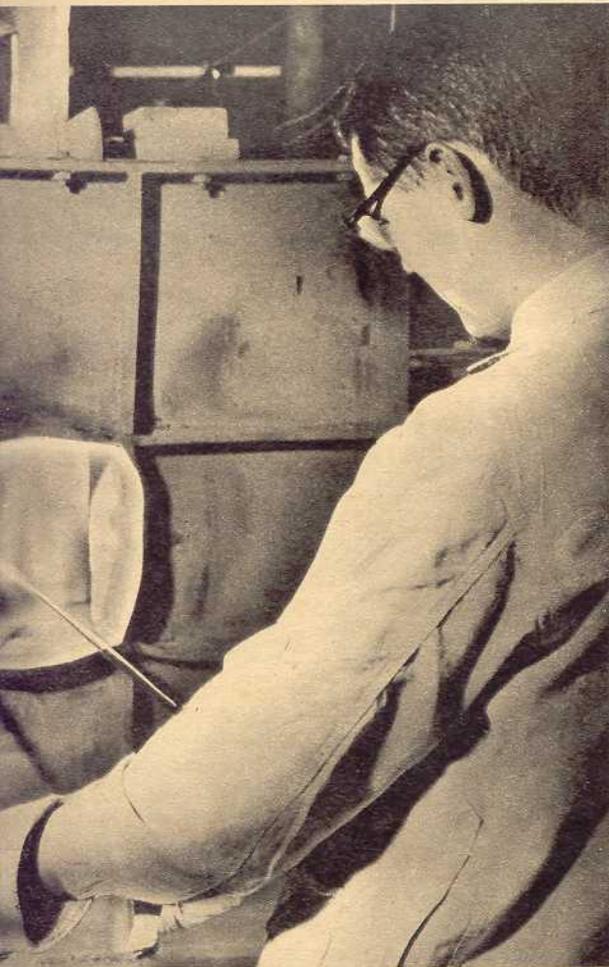
Division Outgrows Quarters

On September 1, 1955, Avco formally activated the Research and Advanced Development Division at Stratford, Conn.

Meanwhile, attracted by the unique research opportunities at RAD, scores of scientists, engineers, and laboratory technicians were joining the rapidly growing organization. Within a year, the division, by now active in many fields of advanced research, had out-

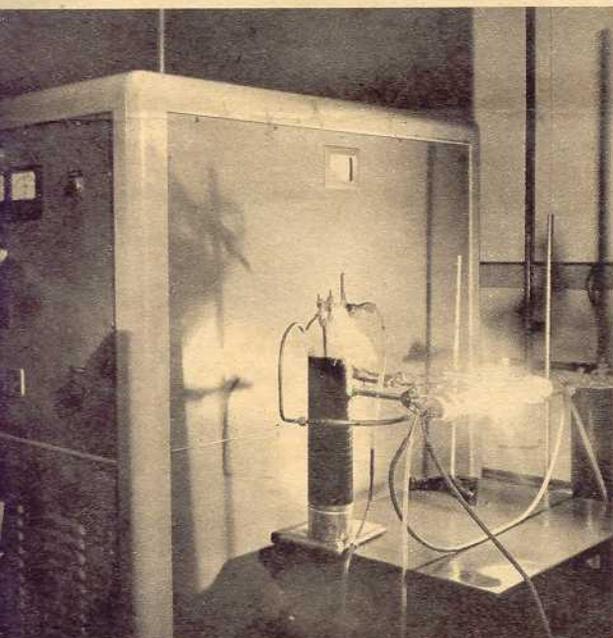
Continued on next page





FURNACE GLOW AT 1,300°C

Center is not a mass-production outlet, models and
ed in Wilmington. The gas-fired furnace above is
ating metals before fabrication.



EXPERIMENTAL SIZZLE

er-broil at 4,000 degrees during a research experiment
es laboratories at Avco's Wilmington Research Center.

grown its temporary Stratford quarters, and in June of 1956 a decision was made to move operations temporarily to the former Wood-Ayer textile mill in Lawrence, Mass. The transfer to Lawrence was begun in July and completed during the fall of 1956.

Vital Mission Is Revealed

It was not until almost one year later that the news of RAD's mission could be reported to the public. The announcement made headlines from East Coast to West Coast.

The news was that Avco RAD had been working under an Air Force contract of \$111,000,000 to develop re-entry vehicles—nose cones—for the Titan ICBM (intercontinental ballistic missile), a project tagged with the nation's highest defense priority.

Pioneering work on the re-entry problem—what would happen to a missile's nose cone as it hurtled earthward through the blistering heat barrier of the outer atmosphere—had been accomplished at the Avco Research Laboratory in Everett.

The shock tube method of simulating the re-entry flight problem perfected at Everett was a sensational breakthrough in Space Age research.

Wilmington Construction Announced

As RAD Division passed its second year of pioneering activity, plans were announced for the construction of its permanent home at Wilmington, Mass.

Designed by the eminent architectural firm of Pereira & Luckman, with engineering by Metcalf & Eddy of Boston, the new division headquarters would extend one-fifth of a mile and cover 16 acres on a site of 100 acres. The project would be supervised by Cabot, Cabot & Forbes, noted industrial developers and would be built by Aberthaw Construction Company.

As discussed by the founding committee of scientists and Avco Corporation's top management team, the bold scope of the original concept would now become a structural reality.

In the meantime, keeping pace with the fast-moving construction program at Wilmington, further scientific advances were recorded by the division in the year which followed.

Outer Space in Laboratories

Vitally important research tools were devised: including plasma generators creating temperatures up to 20,000 degrees, a powerful shock test machine delivering a "knockout punch" of 100 times the force of gravity, a noise generator reproducing a sound level comparable to the blaring of a million auto horns, and a camera system able to "freeze" the flight of a speeding projectile.

The creation of such test equipment brought outer space environments into laboratories in order to test missile components.

In the summer of 1958, as the division's move to futuristic headquarters at Wilmington got under way, the Air Force selected Avco to develop nose cones for the Minuteman ICBM, the most advanced "bird" in the Air Force's weapons arsenal.

By September 1, 1958, RAD's move to Wilmington was completed and the Avco Research Center was in full operation. Today, RAD president James R. Kerr and a staff of 2300 scientists, engineers and supporting personnel are headquartered here.

This brought to fulfillment the original design for quarters, equipment, and staff to deal with the perplexing problems posed by Space Age science. And the record of accomplishment continues to justify Avco's investment in scientific progress.

Most recent in the series of headline-making events was the announcement of the first successful recovery of a nose cone which had re-entered the atmosphere after a flight at ICBM range and velocity.

Material for the re-entry vehicle of the Thor-Able missile which made the flight was developed for the Air Force at the Wilmington Research Center.