SPRAGUE ELECTRIC COMPANY

Celebrating 35 years of growth...
In 1929 the Sprague Specialties Company, as it was then known, made a strategic move which profoundly influenced its subsequent career - it established a small research and development department staffed by scientists and engineers.

Our efforts proved successful and from 1933 to 1936 our sales almost tripled. We were reaping a rich harvest of the splendid work done by our research group between 1929 and 1932.

A study of research-based enterprises in New England shows that most of them were created and operated by people of scientific and technical, rather than general business background. This was true of Sprague in its early years. As the Company grew our informal management controls broke down and our expenditures were significantly above our receipts.

It is not necessary to recite all the agonizing details of the problems that followed. Suffice it to say that we completely curtailed our research program from 1933 to 1936. By establishing a very rigid financial program we were able to save the Company from bankruptcy but the penalties imposed on us for our four years suspension of research and development were almost catastrophic. Contrary to the main course of the Nation's economy and the steady broadening of the market for electronic components, we floundered badly from 1937 through 1940. Over-all, we showed a general decline in sales accompanied by a progressive degeneration in the rates of profits to sales, as we had lost the competitive advantage derived from a flow of new products. It would be difficult to find a more concrete and conclusive example of the overriding importance of research and development to progress in the electronics industry.

Beginning in 1936 we reconstructed our research and engineering department and laid out an extensive research and development program. This embraced not only the entire capacitor field but extended into areas wholly new to Sprague operations. We knew better than to expect early rewards from this program, however urgent the need. Our experience had shown us that the road from general concept to tested production products is long, rough, tedious and expensive.

The difficult experiences of the early thirties taught us a lesson we have never forgotten. Today Sprague Electric has the largest research and engineering staff of any firm in our branch of the electronics industry.

Perhaps the best way to summarize our feelings while celebrating our 35th anniversary would be to quote a paragraph which appeared in the February, 1939, LOG:

"To stay at the top requires constant study, continual experimentation and never-ending re-checking of results. So long as Sprague can be first in development and quality — and competitive in price, we shall keep the confidence and business of our customers and have the orders to keep us all busy and employed."
With every new invention, countless improvements and additions present themselves to those with inquiring minds. So it was with the invention of the radio and Robert Sprague’s idea for a “Tone Control”. The then young naval lieutenant discovered that the addition of the proper capacity value across the output of the radio and the input of the separate speaker then used with most sets, made possible a pleasing improvement in tone quality. With this idea a business was born!

The market for the Tone Control proved to be somewhat limited. The original enthusiasm of friends could not be transmitted into large orders for production. The heart of the Tone Control, however, contained a midget-size, fixed paper condenser of radically new design which was less than one-half the size and only one-eighth the weight of the standard Mica condenser then in use.

At this point a major decision was made. The Tone Control was put on the shelf and all efforts were directed toward the “Midget” condenser (or capacitor as it is now called). The response from the industry was immediate and sales climbed at a remarkable rate. By the time it neared its third birthday, the Company had risen from the original two persons to a peak of five hundred and fifty, and its sales were running in excess of half a million dollars a year.

A recent study of research-based enterprises in New England shows that most were created and operated by people of scientific and technical, rather than general business background. This certainly was true of Sprague in its early years. Our early development and success were outstanding, and probably could only take place in a country such as ours. However, at this point several major decisions were made which enabled the Company to grow to its present size and which will continue to keep it growing in the years to come. As it grew, our Company attracted to it men of outstanding ability in research and in business to expand our sales, production and research. Certainly no small amount of credit is due to the whole team which has labored so long and so diligently for one purpose—the success of Sprague Electric Company.
"...what promises to be the most important new industrial development North Adams has seen in a generation..."

"...it is obliged to refuse thousands of dollars' worth of business in seeking facilities to meet a pressing demand for expansion at the earliest possible date..."

"...an established electrical industry that will eventually give employment to at least one thousand people, with possibilities of expansion far beyond that point..."

"...reports on the Sprague enterprise were obtained from disinterested sources, and they were, without exception, of an entirely favorable nature. They were, in fact, even stronger than the statements made by the Sprague brothers themselves."

"Another unusual aspect of this conference, which laid the foundation for the negotiations that have now been consummated, is the fact that this stock subscription was not sought by the Sprague company, but was offered voluntarily by the local interests represented."

"The operatives employed are mostly women and girls, who without previous experience can, it is said, be trained to operate the special machinery used, in about a month's time."

"The Sprague condenser has qualities that distinguish it from any other make on the market, and its rapid acceptance by electrical appliance manufacturers, both in this country and abroad, during the past three years bears out its claim to definite improvements over previously developed types."

"North Adams has been in the keenest competition with such other Massachusetts cities as Lowell and Holyoke to convince the younger Spragues that it would be to their advantage to locate here."

"As an indication of the impression made upon the leading manufacturers, bankers and business men of this city by the record and prospects of the Sprague enterprise and the personality of its executive head, it is a notable fact that in a ten minute conference following an exposition of the company's history to date and its plans for the future, those present agreed to underwrite a subscription to $100,000 of preferred stock on an increase in the company's capitalization."

"The market for the company's product... covers a multiplicity of electrical appliances not only in this country but abroad, and in laying the foundation for its further rapid expansion and aggressive sales policy is now in full operation."
On April 1, 1930 the Sprague company started actual operations in North Adams. Twenty-five young women, who had been trained in their duties for two weeks, started the wheels turning on the first condenser ever manufactured in North Adams. Ten to 15 employees were added the following day, and so it was for many years to come. Considerable work was entailed in putting the Beaver Street plant in shape and a small army of carpenters, electricians, painters and what not were kept busy for months.

During its early days in North Adams, however, all was not clear sailing and the Company had its crises, trials and misfortunes, but the dogged sincerity of purpose and the will to go on no matter what the cost and how dark the outlook finally achieved victory.

In 1933, as a result of the growth of the Sprague business, a new concern was formed for the purpose of handling certain sales, known as the Sprague Products Company. Mr. Harry Kalker was president and treasurer of this business which was entirely independent of the Sprague Specialties Company.

Growth was continued and steady and in July of 1935, five years after operations started in North Adams the employees numbered 700 and everything indicated that the Company was fast approaching the 1,000 mark, predicted in advance of its move in 1930.

At the end of its first year here, Sprague's was rated fifth in the industry. It employed approximately 300 workers, sold about 5,000,000 condenser units, paid out about $350,000 in wages and manufactured about 100 different types of condensers. The average hourly wage was 25 cents.

By 1940, it employed more than 1,300 men and women, sold about 50 million units, paid out $900,000 in wages and made 4,000 types of condensers. And what is more important, its average hourly wage jumped to 50 cents. On its tenth anniversary in North Adams, Mr. Sprague proudly announced that the Company had reached the No. 1 position in the condenser industry!

Products that helped build the business

The Sprague Midget Condenser, placed on the market in 1927, was the "Model T" of the Sprague Specialties Company and, like Henry Ford's famous product, paved the way for better things to come. The history of many manufacturing concerns can be told in terms of products manufactured, and the Sprague Midget was outstandingly successful.

Sprague Specialties Condensers have been manufactured in thousands of variations but a chronological story of the Company's history can be told in general terms by the following list of products and the years in which they were introduced by us to the industry: 1926 Introduction of the Tone Control, 1927 Sprague Midget, 1929 Wet Electrolytics, 1930 Dry Electrolytics (Sprague the first P.R. Mallory licensee), 1931 D.C. Drys, 1932 Paper Tubulars, 1933 A.C. Drys, 1935 K.V.A.'s various trimmer condensers, 1936 Moulded Micas, 1937 Pushbutton Tuners, Silver Micas, 1938 Liquid Compensators, 1939 New type Koolohm Resistors, 1940 Welding Capacitors, Special Production of Gas Masks, Graphitized Condensers.
Several employees of the original Quincy Plant moved to North Adams with Sprague in 1930. Their skill and knowledge proved invaluable in the new community which until then had never done work of this type.

As evidenced by the reports in the local paper, Sprague Specialties was welcomed wholeheartedly by the community. Large numbers of local citizens were anxious to obtain employment with the new and growing electronics firm. Many of the city's older industries had closed shop and there was a large available labor force.

In 1931 our sales ran over the million mark for the first time. We had a dynamic three-step organization in research, production and sales. The country as a whole, however, was having rough sledding. The Great Depression was biting deep into the economy. Early in the year it became fairly obvious that Sprague was growing too big to operate under its informal management controls. Our expenditures were dangerously above our receipts. We needed help!

A management consulting firm was employed to study our complete organizational set up from beginning to end. Despite our efforts, the irons were already in the fire for 1931 and we ended the year with record sales and a net loss of monumental proportions.

The next few years were a life and death struggle to save the infant enterprise. Fortunately we were able to arrange a two-year extension of our loans and a similar extension with our principal merchandise creditors. Expenses were pared to the bone and all research for new products was eliminated. We took desperate measures for a desperate situation. Every solitary cent over our barest necessities was given to our creditors.

Typical scenes from the 30’s

IN COME THE ORDERS

DRAFTING GOES TO WORK

PRODUCTION ON SCHEDULE
Surely things are never all black, and so it was with Sprague during those crucial years. In the period between 1933 and 1936 our sales almost tripled. We were reaping the harvest of the excellent research and development work done between 1929 and 1933. Without this sales boost, all our other efforts would, no doubt, have been in vain.

There is a time element in the marketing of any new product which gives it a period of from three to five years of high profitability. By the end of the period, competitors begin to catch up. They either duplicate the product through a comparable invention, or work their way around the original patents.

By 1936 the Company was largely debt free and sales and profits soared to an all-time high, but our new products were running out. We were in a position to tackle the research and development which had been in the deep freeze since 1932, but had we waited too long?

With one crisis behind us, we were running head-on into another. We could not avoid the penalties imposed on us for our four-year suspension of research and development. We had lost the competitive advantage derived from a flow of new products. Contrary to the economy of the country as a whole, Sprague sales declined and we experienced a degeneration in the ratio of profits to sales. From 1937 through 1940 competition became increasingly intense on more and more of our products. If we had ever needed proof of the importance of research, we had it now.

Our reconstructed research and development departments were hard at work, but it is a long and tedious road from an original idea to tested production. In retrospect it is encouraging to know that the products developed during these years were largely responsible for our outstanding success during World War II.

Suffice it to say that Sprague weathered the storms of the 1930's and as the war clouds grew more threatening, we were in a position to be of outstanding service to our country.

ACCOUNTING AND BOOKKEEPING THEN, AS NOW, AN IMPORTANT FUNCTION

DEFENSE PRODUCTION

During the late 1930's Sprague faced difficult times. Although the United States was not actually involved in the war, it was already affecting our business. Annual sales for 1938 were considerably below the previous year, and the drop might well have been more pronounced had we not made numerous improvements in manufacturing processes, and introduced several new items to our product line.

Despite the reverses of the moment, we purchased a portion of the Hoosac Worsted Mill on Brown Street in 1937 in anticipation of future expansion. (The balance of the property was purchased later.) The decision proved to be sound and as the war clouds became more threatening, we had adequate facilities available for war production. Our Brown Street plant was basically designed for defense activities, with standard production continuing at the Beaver Street plant.

As the whole country went into war production, we had another strong oar pulling for us. Our research and development department had been expanded and we were moving ahead rapidly with products which we had never before manufactured. Our unique and forceful contribution to the war effort was based largely on the outstanding research and engineering work done during the 1936-1939 period. One of the prime reasons for our success was the ability to market new developments a little sooner and to keep quality a little higher while still keeping within a normal price range. To this was added the imagination, cooperation and drive to carry through under constantly changing conditions.

BROWN STREET PLANT
IN THE LATE 30'S
CONDENSERS IN OUR UNITED STATES DEFENSE PROGRAM

WAR IN THE AIR, on land, and under the sea. This imaginary battle scene (above) dramatizes the surprising importance of Sprague condensers as a cog in the highly developed military weapons of attack and defense used in our Defense Program. Numerals identify some of the special uses of condensers in modern warfare.

1. Tank ignition system condenser.
2. Two-way radio in tanks.
3. Battle cruiser has radio, plane and submarine detectors.
4. Airplane transceivers.
5. Submarine receives instructions from scouting plane.
6. Portable sets used by parachute troops.
7. Headquarters dug-out must have condensers for phones and switchboard.
8. Land mine is exploded by remote radio control.
9. Radio beacon sends bombers off on beam.
10 and 11. Airplanes have special magneto condensers and must have special condensers masking out radio interference caused by motors that might distort important radio message.
12. Motorcycle scout reports back to armored division in rear.
13. Headquarters has elaborate radio and detection apparatus.

An inevitable result of the present American arms program has been acute shortages of many basic materials used in condenser design. Read "Never Like This Before," below...

"NEVER LIKE THIS BEFORE"

There just isn’t any definite answer to the question “When will we get delivery?” Sprague Specialties is working at top speed and we feel we are doing a creditable job in turning out our products under present very unusual conditions. We are, however, unable to get definite promises of delivery from our suppliers and are unable to give more than careful estimates to our own customers. Even these estimates of when delivery can be expected may be thrown out of gear by any of several factors that have created a situation unique in our experience.

First, as mentioned, we are unable to get delivery dates from our own suppliers. This makes a tremendously difficult problem when it is realized that we have six thousand active items of raw material and manufacture condensers to four thousand different specifications.

Secondly: we are up against the job of estimating our own needs for periods eight to ten times longer than we ever had to estimate before. Condenser tissue, for example, which we used to get within four days, now takes twelve to fourteen weeks. The same sort of delays exist in foil, brass and other products.

B-7 PRIORITY RATING A HARDSHIP

The Government has decided that the radio industry shall be placed in the B-7 priority list on aluminum and zinc. This is almost at the bottom of the list. The result is that suppliers cannot ship to us until they have filled higher classification orders even though they received such orders long after hearing from us. Government orders too, of course, have priority over other orders received here and having a lower priority rating.

SPRAGUE CUSTOMERS GET NEAR 100 PER CENT

In spite of all these really unprecedented difficulties and the necessity for finding substitutes and checking and testing them, Sprague Specialties has continued to give its commercial customers almost as many condensers as ever supplied at any previous peak.

The employees in the Sprague plant are aware that the more condensers of good quality they can turn out the greater will be the number of orders which they can handle, and the more good will gained, we hope, for the future. Management is also sparing no effort to keep things moving at maximum speed and with a minimum of confusion and cost.
John Sullivan receives his Army-Navy "E" Award pin from Capt. J. S. Evans, U.S.N.

A huge crowd assembled in the Brown Street plant for the award ceremonies.

Attractive girl ushers helped highlight the occasion.
TEMPO OF WAR CHANGES! SPRAGUE WORKERS ASKED TO SET NEW RECORDS

SPRAGUE AWARDED 5 ARMY-NAVY “E”S
1 NAVY ORDNANCE BUREAU “E”

Five Army-Navy “E” Awards and the Navy Bureau of Ordnance “E” were made to the employees of Sprague Electric Company, Beaver and Brown Street Plants during the course of World War II in recognition of their exceptional production record in the war effort. The Army-Navy “E” pendant was awarded to the Company for high achievement in war production and for uniting efforts on the home front. The U. S. Treasury’s Minute Man flag was also presented to the Company for the employees wholehearted participation in purchasing War Bonds and stamps. The award represents a concerted drive of only 10 days duration during which 90 percent or more of the Sprague employees unhesitatingly pledged themselves to purchase stamps and bonds through a payroll deduction plan.

The five Army-Navy “E” awards and the Navy Bureau of Ordnance “E” were spaced out during the course of the war. The first award was announced on February 27, 1943 and the others were announced on September 25, 1943, April 22, 1944, October 28, 1944 and May 12, 1945. The Bureau of Ordnance “E” award for the Company’s work on the VT or proximity fuze had been delayed due to the cloak of secrecy which surrounded the project, and was not made until September 26, 1945.

The North Adams Transcript of March 1, 1943 said in announcing the first “E” award: “The fact that the Army and Navy jointly are awarding the flags makes the honor all the more noteworthy. Joint awards are rare. Only one per cent of plants engaged in war production, it is estimated, receive it. The Sprague Company is the first in Northern Berkshire to receive the honor.”

Robert C. Sprague accepted the Army-Navy “E” flags presented during the ceremony. With the acceptance he pledged our redoubled effort in war production and thanked every employee “for long, hard, patriotic work which won the award.”
The War years brought a tremendous expansion in our product line. The humble “midget” condenser was developed and expanded to include uses never even contemplated previously. Pictured above are some of the many newly developed products. (In addition to our component production, gas masks were produced at our Brown Street plant under a special government contract.)

Employment rose rapidly to well over the 3,000 mark. Special shifts were setup for those who could only work part-time, and even high school students were recruited for a few hours after school. A local manufacturer with raw material problems made arrangements for his employees to work every other day for us. Our production was truly a community effort with thousands of women working full time as their contribution to their loved ones on the battle scene.

Saleswise, our best pre-war year had been 1936. In 1944, our last full year of war production, our sales ran to more than $20 million, some seven times the 1936 volume. Over the same period our employment had risen by nearly four times, including a five-fold expansion in the number of engineers and scientists in our research and engineering department.

One of our major contributions to the war effort, and one of the best kept war secrets, was the Variable Timing (V-T) Proximity Fuze pictured below. The fuze was an extremely rugged, five-tube radio sending and receiving station which fit into the nose of a projectile. It played a dominant role in defeating Japanese kamikaze attacks on U.S. vessels, and the Army version of this same fuze, held in reserve until the critical Battle of the Bulge, has been widely credited with bringing the war in Germany to a quick end and saving thousands of American lives.

Our engineers also produced the unique high-voltage capacitors which made possible the first microwave airborne search radar which drove the German submarines from our East Coast and the Caribbean, and then penned them in the mid-Atlantic. When the communications and radar systems of British tanks opposing Rommel broke down because of North African desert heat, our capacitors, flown to Alexandria, gave General Montgomery reliable eyes and ears, and set the stage for the successful Allied Campaign in North Africa. Sprague designed and built the capacitors which triggered the Nagasaki atom bomb bringing an end to the Second World War, and has continued to supply them for our growing production of atomic and nuclear weapons.

Warheads containing the V-T Proximity Fuze were an important part of our contribution to the war effort.
"Here at Sprague's everything possible is being done to move forward the Company's postwar plans, subject to the many difficulties which confront both the component manufacturers and the electrical industry as a whole."

Sprague LOG -- September 22, 1945

WITH WAR'S END WE TACKLED RECONVERSION

The immediate post war period was difficult for everyone. Government contracts were cancelled, the rush of the war years was over, and civilians and service men alike were starting anew. Not only component manufacturers, but almost every industry in the country, faced the same problem.

Shortly before the end of the war, on November 24, 1944, Sprague purchased the Marshall Street Plant, formerly the Arnold Print Works. In the post war years this extensive property was converted to house our main executive offices, the prime research and engineering laboratories and extensive manufacturing facilities.

At about the same time, April 1944, we announced an official change in name from Sprague Specialties to Sprague Electric Company. It was felt that the new name more effectively represented our growing operations.

It is often said that 'difficulties breed character' in individuals, and the same may be said of Sprague Electric. We had our difficult times, but we proved ourselves thoroughly in the war years — and at war's end we stood on the threshold of our greatest development and growth.
Early in 1945 Sprague Electric expanded its production beyond North Adams for the first time. Under a sub-contract agreement with Rock of Ages Capacitors, Inc. of Barre, Vermont we supplied raw materials, equipment and technical production knowledge for the manufacture of paper and molded tubulars. “Black Beauty” molded tubulars proved to be one of our best selling items for many years. They were smaller than the usual paper tubular capacitor of an equal rating, yet they stood up under the most rigid tests and were adapted to numerous uses from home and auto radios to military and aviation equipment.

In 1946 we acquired our first wholly-owned subsidiary, Sprague Products. Back in 1933 Mr. Harry Kalker, our first sales representative, established a small business selling Sprague components to jobbers and distributors. Buying units in quantity, much like any manufacturer, he had them attractively packaged in unit quantity for re-sale. Built on individualized service, Sprague Products is the largest operation of its kind in the electronics industry, and today makes more sales in a single week than were made during the entire first year of operation. Sprague Products and Sprague Electric, combined, are equipped to handle any order, no matter how large or how small.

With the expansion of our product line we began the production of ceramic condensers. Originally manufactured at Marshall Street, we expanded our production in 1948 with two additional facilities. A branch plant was opened in Nashua, New Hampshire and we purchased our second wholly-owned subsidiary, Herlec, Corporation of Milwaukee, Wisconsin. Renamed, Sprague of Wisconsin, Inc., the company still produces ceramic and hermetically sealed metal cup capacitors. The Nashua plant is one of our larger branches with an employment figure in excess of 800. Its product line has been expanded to include printed circuits, resistors, and metal clad paper capacitors, in addition to ceramic condensers.

**TELEVISION BOOSTS SALES**

We were proving beyond a doubt that we had the ability to ‘deliver the goods’ in the post war period. The advent of television on a broad scale gave both sales and profits a steady upward push. Then the unforeseen cold war brought new pressures on us from the armed services and their prime contractors. Throughout
SURE OUR POST WAR GROWTH

this entire period our expanded research and engineering group worked with a
diligence and dedication that paid off in a constant flow of new products and im-
provements on old.

With development facilities located in North Adams, new product lines were
also started here to facilitate correlation between research and production.

In 1951 we expanded our wire production with a branch plant in nearby
Bennington, Vermont and in 1953 began construction of a plant in Ashe County,
North Carolina for the production of dry electrolytics. Wire production has been
somewhat limited, but the Ashe County plant has grown over the years and now
employs over 600 people.

PRODUCTION AND ENGINEERING EXPANDED

As electronic systems became more complicated, many concerns had tech-
nical problems requiring assistance from experts. Sprague’s Field Engineering and
later our Interference Control Field Service were providing a unique service in this
field. In 1955 an operation was established in Los Angeles to better assist our West
Coast customers. In 1958 our second West Coast venture was started in Visalia,
California. Here we produce noise suppression filters, computer magnetic com-
ponents and semi-conductor digital circuit assemblies.

In the early 1950’s two new products became important in the electronics
picture. They were solid tantalum capacitors and precision etched switching tran-
sistors. In 1956 a plant was opened in Concord, New Hampshire for the production
of these two products. In a short period of time it has grown to be the largest
branch plant, employing over 1,000 people. At the present time additional
facilities for solid tantalum production are being opened in Plymouth, New Hamp-
shire. Current indications are that these units will be an important part of our
business for some time to come.

In 1956 we purchased our fourth wholly-owned subsidiary, Dynacor, Inc.,
for the manufacture of bobbin and tape cores for magnetic amplifiers, and in 1959
we added our fourth North Adams plant.

At present we have a formidable network of facilities for producing all
types of electronic components. We have high hopes of retaining our number one
position in our field and this will doubtless include further expansion.
Sprague Electric's foreign business has developed dramatically since the end of World War II. Prior to that time our small export sales were handled by independent exporters, but in 1947 Mr. William Adams joined the Company to handle our overseas business. His extensive background in European and American business has proven invaluable in developing our expanding overseas operations.

With the advent of jet travel and the early 'space age' developments, the world is no longer divided into isolated spheres, and, it is not unreasonable to assume that trade between nations will increase.

We have an extensive foreign business as indicated by the map below. Our first overseas operation was started in Puerto Rico in 1953 and we have expanded steadily since that time. Without a doubt we can anticipate a further growth as needs indicate.
Sprague engineers board a Company plane for a quick trip to one of our branch operations.

COMPANY AIRCRAFT FULFILL A NEED

As the corporate structure of Sprague Electric became enlarged, travel by key personnel in the course of Company business became more extensive. With local airport facilities available it was decided to set up a flight operation to expedite this travel and rush shipments of products. Originally chartered planes were used but it soon became apparent that a Company plane would better satisfy our needs.

In 1951 Mr. Robert C. Sprague, Jr. assumed control of all aviation operations. These operations have been expanded to the point where we now have four planes and five pilots operating on a round the clock schedule. In 1960 Company planes flew a total of 2000 hours, almost 320,000 miles and carried 1585 passengers.

The electronics industry is fast-paced and is subject to rapid changes in product and technology. A great deal of Sprague Electric's success is due to the Company's ability to provide thousands of customers with fast and dependable service. This often means that important business depends on our ability to have people at the right place at the right time. Toward this end, our aviation department has filled an important need.

'We feel our aviation department serves an important purpose in our Company. We think it definitely enables us to better fulfill our principal goals, and pays us "dividends" in convenience, speed, dependability and sales dollars."
Electronic components have now developed to a degree of efficiency not even anticipated in 1926 when Sprague first entered the field. Ballistic missiles, space vehicles and computing machinery require great quantities of components in a minimum of space and with a failure rate 100 to 1,000 times less than previously considered acceptable.

The discovery of the transistor a decade ago was an event of highest importance in shaping the course of our industry's efforts in the direction of miniaturization. The lower operating voltages and temperatures of the transistors also brought about a need for development of smaller capacitors, resistors and inductors to match the size of the transistor.

During the decade of the 1950's many opportunities presented themselves for the development of Space Age components, for which the basic scientific foundations were known but application techniques remained to be developed. Increasingly, however, the rapid advances being made in the design of complex electronic systems demand that the frontiers of knowledge about the electrical behavior of matter be extended far beyond the present state of the art. Thus, the limitations of materials will probably be the major challenge to the development of advanced circuit devices in the 1960's.

The major goals of our research effort continue to be the further miniaturization of our products, the attainment of the ever-higher levels of reliability, and the development of new families of components, especially those designed for use in low-voltage transistor circuits.

Sprague Electric, with its present staff of 450 highly qualified scientists, engineers, and other personnel in research and engineering, is in a position to maintain a strong technical leadership in the fundamental disciplines on which future generations of components will be based.

Shown on the cover is the new Research Laboratory now under construction in North Adams. Ground was broken in May, 1961 and the building is scheduled for completion early in 1962.
WE LOOK TO THE FUTURE!

What does the future hold for Sprague Electric? No one can answer that question completely, but we do know that over the past thirty-five years we have built a dynamic organization on a solid foundation. During our last 30 years we have averaged a yearly growth in net sales of over 16%. We have every reason to anticipate a continuing and encouraging expansion in the years ahead.

Since 1926 Sprague has grown from a very modest start to a world-wide organization. To paraphrase an old saying, "the sun never sets on Sprague Electric". Our manufacturing facilities will soon extend from North Adams to Hong Kong.

When the Company was organized in 1926 as Sprague Specialties, the radio was a relatively new and dramatic development. Since those early days of the Electronics Era, television, radar, guided missiles, space capsules, and data processing equipment have been developed with startling rapidity, enhancing our Company's opportunities for growth and service.

At the present time we are building extensive new research facilities. We know from experience that only by constant development of new products, and improvements on old, can we retain our position as a leader in our field.

We look to the future with confidence knowing that our past efforts have been successful. As we celebrate our 35th anniversary we stand on the threshold of a challenging new era.

SPRAGUE ELECTRIC COMPANY
The Sprague Electric Company is one of a very small number of companies in the country to celebrate its 35th anniversary with the founder of the company still its active head. This is much more than an interesting statistic. In simple terms of job security it means that Sprague Electric has had consistent leadership throughout its history. It is also most encouraging to realize that our Company has shown a steady rate of growth since its founding in 1926. To be sure there have been ups and downs, but the pattern has been one of continued healthy development and expansion.

Taken as a whole, the electronics industry has a higher rate of business failure than industry in general. By contrast, Sprague Electric has shown a profit each year since the early thirties and continues to provide steady employment for an increasingly large number of people.

We can be justly proud of our many employes with long service records. At the present time we have 63 employes with over 30 years service, 288 with over 25 years service, over 450 with over 20 years service and almost 1,000 with over 15 years service.

Sprague Electric has been an important factor in the dynamic electronics industry for many years. Our increase in employment to about 7,000 persons thus far in 1961 is significant evidence of our internal strength and vigor. We are part of an industry which is expanding over the longhaul and which is developing many new products unthought of just short years ago.

As we continue with the kind of outstanding leadership we have had in the past, Sprague Electric will continue to make significant contributions to our economy in this age of electronics.