



NATIONAL ISSUE

LOG



SPRAGUE ELECTRIC COMPANY

NORTH ADAMS, MASSACHUSETTS

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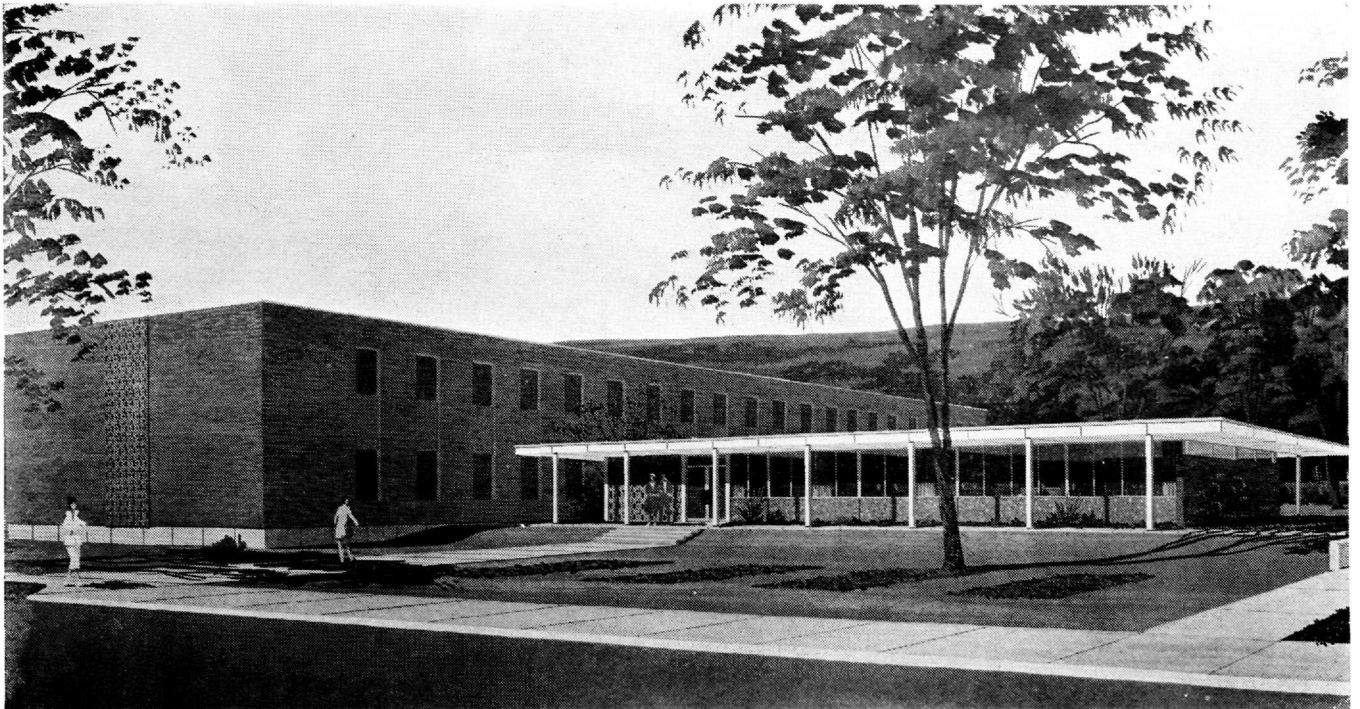
No. 7



'In Your Hands'

Story on page 19

Dedicated to the future



Confirming its belief in the future of its products, its community and itself, the Sprague Electric Company will start construction of an all new modern research center early this summer. This completely air-conditioned building of masonry construction will face on Marshall Street in North Adams, Massachusetts, opposite the Company's main executive offices. Present plans call for occupancy in the early summer of 1961.

In the artist's conception (above) the right wing of the building will contain general offices, a conference room, a visitor's reception room, and the library. The larger section on the left will house research laboratories. Within the laboratory area there will be a number of ultra-clean, temperature and humidity controlled rooms for critical solid

state physics work. Parking areas will be plotted to the east of the building and the whole area will be landscaped. Services, such as gas, electricity, and water will be provided from the Marshall Street plant via a tunnel to be constructed under Marshall Street.

The building, containing 39,050 sq. ft. of space, is the first phase of plans under consideration, and is so designed as to permit flexibility of design of later additions to best fulfill our future needs. Present indications are that the ultimate building will be approximately three times the size of the initial construction and will completely occupy the area between Marshall and Holden Streets. The newly acquired area between Holden and Lincoln Streets will be reserved for parking by employees of the new research center.

SPRAGUE ELECTRIC COMPANY

OWNED BY 2463 STOCKHOLDERS

DIRECTORS

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JULIAN K. SPRAGUE
President

1926



1960

Change



Progress



ROBERT C. SPRAGUE
Chairman and Treasurer

Achievement

The story of Sprague Electric began in Quincy, Massachusetts, in 1926 with the invention of a "Tone Control" device by Robert C. Sprague. The heart of this device was a tapped, fixed paper condenser, of radically new design, which with the accompanying switch—made available seven different capacity values at the choice of the operator. As a result, in early 1926, patent applications, later granted, were filed on the device and the new condenser used in it, and the name "Tone Control" registered with the U.S. Patent Office.

In June of 1926 the Sprague Specialties Company was born to exploit the "Tone Control's" possibilities for profit. (That corporate name was to be changed in 1943 to Sprague Electric Company, to better reflect the Company's operations and purposes.) Small personal savings, plus the sale of stock to a few friends and relatives, provided the Company's capital. Julian Sprague joined the young Company a few months after its formation.

Arrangements were made to have the special condensers made by a neighboring electrical firm, the assembly of the condensers and other parts by a second manufacturer, and the promotion and sales done by a third firm. All the Spragues proposed to do was supervise and coordinate.

It didn't work out as planned, so they had to take over both the manufacture of the condensers and, without any experience, the selling and merchandising of the finished product. They weren't successful in selling it in adequate volume to cover costs and expenses, and by mid-November less than one half of the original capital remained.

At this point Julian Sprague suggested that the basic features of the new condenser, which was the heart of the "Tone Control", be incorporated in a small fixed paper condenser of radically new design. This was done, and resulted in a "Midget"® condenser which was less than one-half the size and only one-eighth the weight of the standard Mica condenser then in use.

Among the assets of a small, closely-held firm are its ability to make major

decisions quickly, its maneuverability. The Company decided to switch horses in midstream, to shelve the "Tone Control" and to concentrate on making capacitors. Things moved fast. The Company's sales in 1927 were encouraging, and 1928 brought a jump of 400% in volume over the previous year.

By 1929 Sprague's employment had risen to a peak of five hundred and fifty, and its sales were running in excess of half a million dollars a year. This same year the Sprague Company made two strategic moves which profoundly influenced its subsequent career. The first was the establishment of a small research and development department staffed by trained scientists and engineers. . . . The second was the purchase of a large textile mill in North Adams into which it was proposed to expand operations.

Despite the great break in the stock market in October 1929, the Company went ahead with plans to move into the North Adams plant by Labor Day 1930. A net loss of staggering proportions in 1931 led to many necessary curtailments and controls. A two-year extension on loans was arranged and inventories and plant accounts were ruthlessly cut. All research for new products and processes was halted and all expenditures for new equipment and facilities were stopped.

These actions, and other fiscal arrangements, did the job of saving the Company. It had nearly been through the wringer but much had been learned, and by the close of 1936 there was daylight ahead.

The penalties imposed by the four-year suspension of research and development were now a serious factor. As a result the Sprague Company made little visible headway from 1937 to 1940. From 1936 through 1938 it was whipsawed by competition on old products and stymied by the laboratory-to-production time lag on new ones. It would be difficult to find a more concrete and conclusive example of the over-riding importance of research and development to progress in industry.

Meanwhile reconstruction of the Research and Engineering Department was energetically pursued. The Company

also drove forward vigorously in improving methods, machines and equipment, and manufacturing layouts. The research done in the period 1936 through 1939 did, in time, produce innumerable improvements in our standard products and methods of making them. It also brought about a series of new developments which subsequently greatly influenced the whole capacitor industry.

The introduction of improved and new products completely reversed the unhappy trend of the late 1930's and brought the Company to a position which enabled it to mark up an enviable record during World War II, for which it received five Army-Navy "E" awards and the Navy "E" award.

Even though the Company was unable to maintain its wartime volume and employment in the immediate post-war period, it was now well equipped to participate in the tremendous growth of the electronic industry which was ahead.

The Korean War and the rapid burgeoning of television lifted 1950 sales to more than 28 million dollars, which was substantially higher than the wartime peak.

In 1952, sales had risen above 43 million dollars, and from then through 1958 remained in the neighborhood of 45 million dollars each year. A new growth period started last year with 1959 sales above 55 million dollars.

Now let's crystallize the object lesson, or moral, which the history of Sprague Electric so conclusively demonstrates. The moral, like the story, begins with research and development. But research and development are not enough—as Sprague's history also demonstrates. While the Company was pulled through its financial crisis by spartan controls followed by new products, that crisis would never have arisen except for its operational and administrative inexperience at that time.

If the moral cannot be simply "Research or die," then perhaps it should be expressed this way: "Research and develop to earn a higher-than-average profit, but be at least as efficient as your competitors in all other elements of your business, and preferably more so!"

Progress through research



Dr. Wilbur Lazier

Scientific and technical progress depends in an absolute sense on research. But the progress achieved through research, unlike progress in some other fields, does not always move at a smooth pace. It is subject to dramatic accelerations - "break-throughs" at which points, barriers to further technical knowledge and its application suddenly give way. When this happens, progress in utilization which originally seemed decades away may be condensed into a few years or months.

This trait of scientific progress is nowhere better exemplified than in the recent history of the manufacture and use of electronic components. Up until around 1947, the variety and quality of components steadily increased, but the techniques of using them on the part of our customers—tying them together by wire connections and hand-soldering—remained pretty much the same.

Coinciding with, and as a result of, the discovery of the transistor, horizons began to broaden. For the first time, an active element was sufficiently small and its associated low voltage circuitry required sufficiently little power that a true condensation of components into small packages became possible. At the same time, consideration was given to a reduction in the number of connections, and this led directly to mechanized dip-soldering and, in a tremendous evolutionary step, to today's printed circuit boards and condensed packages.

In order to discuss these new ideas, however, it is necessary to retrace our steps through the development of components.

All through the thirties and forties, the variety of components and the complexity of circuitry had been increasing. From the comparative simplicity of the earliest radio, manufacturers evolved the more complex FM radio and then television. A similar complexity developed in electronic equipment used by industry in, for example, electronic control circuits used in the various fields of automation and eventually in computers. All this was stimulated by military research which, during World War II, had taken giant steps forward in such fields as radar, fire control, communications, and navigational aids.

The extent of the increase in complexity of electronic circuits is hard to exaggerate. The old circuits numbered their components by the dozens, the new circuits by the hundreds and thousands. Component densities for AM radios have gone from 10 components per cubic foot to 1,000 components or more per cubic foot including the speaker, which is now the largest part. Obviously, the problems of power, space, and heat dissipation have all greatly increased.

As the forties began, these were among the more important electronic components being manufactured:

1. Paper capacitors, consisting of rolled foil separated by impregnated paper and capable of operating at high voltages.
2. Aluminum electrolytic capacitors, which depend for their operation on a

thin dielectric (non-conducting) film of aluminum oxide and which have a high ratio of capacitance per unit volume through the use of etched foil.

3. Mica capacitors, in which mica serves as the dielectric. They have relatively low capacitance per unit volume, but their leakage currents are low, and they can withstand high voltages.

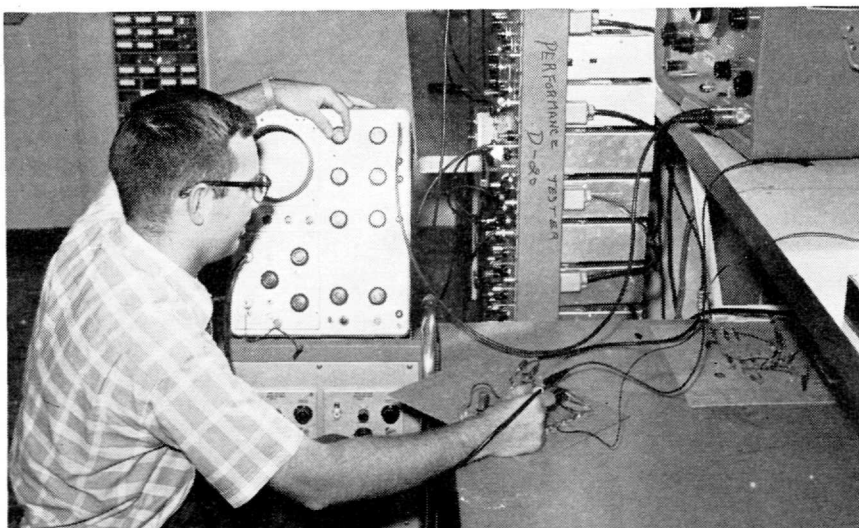
4. Wire-wound resistors, which are precision, stable components but hard to miniaturize.

5. Carbon resistors, much cheaper but also less stable and less accurate.

The coming of war brought a multitude of challenges and problems to the electronics industry. First, of course, was the problem of material shortages and substitute inadequacies. A considerable research effort was expended in these directions. With the removal of these restrictions, the immediate post-war research effort rapidly developed many improvements, such as synthetic and reconstituted mica, polymeric semi-solid impregnants for paper capacitors, smaller ceramic capacitors, high-temperature wire insulations, thin film resistors, new magnetic materials which made possible small high-frequency transformers and, finally, capacitors utilizing plastic films of many types, plastic molded casings, and metallized paper.

This, then, is a sketch of the background leading up to the discovery of the transistor. The transistor, in contrast to the "passive element" components described above, is an active element. Like a vacuum tube, it can perform rectifying, amplifying and switching functions. But it is much smaller than the smallest vacuum tube and requires only one three-hundredth as much power to do the same job. It also requires a different kind of circuitry, a circuitry using lower voltages than vacuum tube circuits. One of the advantages of the transistor's low power requirement was an opportunity for improvement in component reliability, since components were no longer subject to the same high power and high operating temperatures. Lower operating voltages also cleared the way for development of smaller components—tiny capacitors, resistors, inductors, and transformers to match the size of the transistors.

One of the outcomes of the transistor's discovery was a host of new insights into how the passive elements work. This was because semiconductor theory deals with the mechanism of current flow in solids which are not metals in the usual sense nor insulators either.



Performance Testing Magnetic Computer Components at Visalia, California.



One of the notable breakthroughs in component research at about this time was the development of the solid tantalum capacitor. This type of capacitor, now one of the more important new product lines of the Sprague Electric Company, is analogous to the aluminum electrolytic capacitor described previously in that it, too, utilizes a dielectric layer of oxide formed on the metal surface.

Before the development of the tantalum capacitor, there had been a long history of metals other than aluminum that formed dielectric oxide films. But these metals—tantalum, niobium, and titanium—were for a long time not readily available in a useable form. But when new uses for tantalum eventually made it commercially available, it was learned that tantalum in a high state of purity is admirably suited for capacitor use in the form of foil, wire, and porous pellets.

Porous pellets were new to the component field in that they, because of a large inner surface on which oxidation can take place, made possible the manufacture of capacitors of high capacitance per unit volume. Such pellets could not be made so readily with aluminum since, under the influence of high temperatures, the metallic powder fused into a solid mass. But tantalum in the form of powder, when sintered, formed a pellet that was honeycombed through and through with microscopic empty spaces.

Another new technique associated with solid tantalum capacitors was the solid electrolyte. This development followed the discovery that, under the influence of high currents through defects in the metallic oxide layer, the solid electrolyte would decompose, yielding oxygen which would be able to "heal" the damaged film when faults occurred in it.

The completed capacitor had a number of advantages. As indicated before, it had a high capacitance-to-volume ratio. It contained no liquid, was easy to package with a hermetic seal, and was light in weight and small in size. As a result, it has found an important use in computers and complex airborne electronic circuits—not only in airplanes but in the fantastically complex guided missiles now being used to guard our country. All in all, it was eminently suited for the Transistor Age.

Another Transistor Age component is the ceramic thin-film capacitor. Ceramic capacitors were in use long before the transistor, but the ceramic dielectric was relatively thick and the primary application was in vacuum tube circuitry such as required for radio and television sets. The new need was for smaller

ceramic capacitors that could be incorporated into low-voltage transistor circuits.

The semiconductor theory of charge transfer in solids was applied to the electrical breakdown of ceramic capacitors. Laboratory investigations on breakdown mechanisms and the causes of current flow provided the possibility of utilizing thin films from these materials. Consequently, the Sprague Electric Company developed and now is selling ceramic capacitors with the films interleaved with electrodes under the brand name Monolythic*. A completely different approach resulted in a new type of ceramic capacitor with very thin layers of synthetic oxides which we call the Hypercon* capacitor.

In the last five years, some companies that use the components manufactured by the Sprague Electric Company have become interested in the newer aspects of component research. They are concerned with improving systems reliability and learning how to put more and more components into a smaller package.

Such research by component users provides a real challenge to the component manufacturer which makes it imperative to keep continually in the forefront in all fields relating to component advances. We must continually evaluate new materials and approaches and must be prepared to shift rapidly with each new advance in the component-manufacturing field.

Systems people and the military are spearheading a drive toward decreasing the number of interconnections, upgrading individual component reliability and

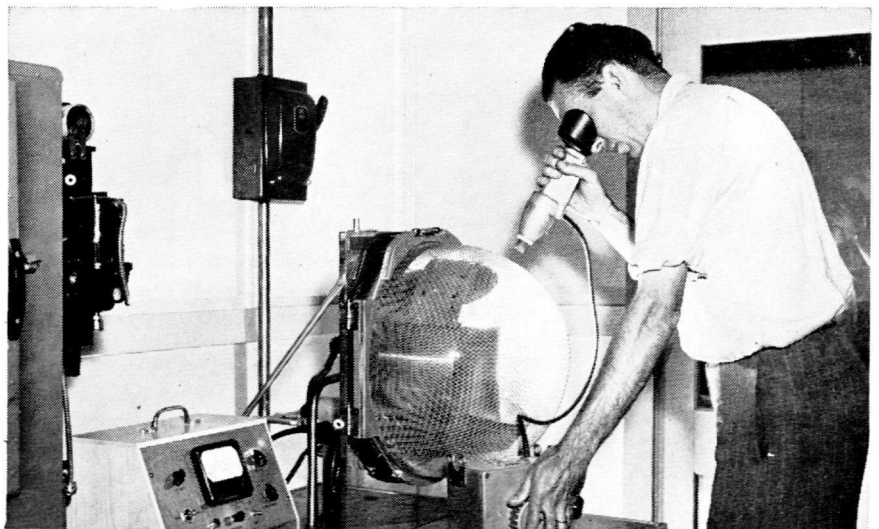
reducing the size of components and circuits.

Various approaches to the problems of microcircuitry have resulted. The micro-module approach, for instance, involves the use of individual components on mounting plates which can be fastened to each other in layers with a resulting standardization of interconnections. Other approaches, such as those of computer manufacturers, involve the extensive use of printed circuit boards. Still other methods are being examined by the U. S. Government laboratories as well as important segments of the electronic industry.

The most forward-looking steps are being taken today in the field of "molecular electronics." Here it is envisioned that individual or "lumped" components in the ordinary sense will be replaced by composite blocks of different materials whose net electrical behavior will be like that of complex circuits.

In molecular electronics, the three types of components—resistive, capacitive, and inductive—would be amalgamated into continuous units in a way which, only a few years ago, it was hard for engineers even to conceive. Such circuitry would obviously cut interconnections to a bare minimum. A whole network would require perhaps only an output and an input. Obviously, these concepts will be most difficult to reduce to practice, and it is certain that, for some years to come, we will be faced with needs for smaller, improved individual components, and for a variety of packaged components for different types of modules, as well as for futuristic combinations

Continued on Page 19



Temperature measurement with an optical Pyrometer in a tantalum pellet sintering furnace at the Marshall St. laboratory.



Employe and community relations



William J. Nolan

Industrial Relations in the Sprague Electric Company consists of two major activities, Employe and Community Relations and Personnel. As service

units their personnel consists of specialists in many fields—employe policies, insurance, wage and salary administration, safety, publications, training, negotiations, plant security, executive aircraft operations, employment, health, community programs and contacts, employe services and many others. The scope of their activity attests to the conscience of management to live by a creed of fair and equitable employe and community relations.

SUCCESS THRU SERVICE

Annually the Sprague Electric Company has the honor of presenting service award pins to an ever growing group of employes who have given long and faithful service to the Company. At some locations such as North Adams and Nashua it has been customary to award these pins at Service Award Dinners, while at others presentations are made in conjunction with the plant's Christmas Party or other plant wide event. During 1959 the Ashe County plant held its first special party for this presentation, awarding pins to 76 five year employes. During the year a total of 226 five year pins were presented, 168 ten year pins, 56 fifteen year pins, 17 twenty year and 31 employes were added to the honor roll of twenty-five year recipients making



Ashe County, N.C. 5 year service award

them eligible for the Company's Quarter Century Club.

With the addition of 31 new Quarter Century Club members in 1959, the Club now has 154 members who are the proud possessors of the diamond pin, wrist watch and Quarter Century Club certificate. The Company and its employes may well be proud of its service award record attained over the past 34 years. Besides the substantial membership in the Quarter Century Club there are 282 employes with over 20 years of service, 795 with over 15 years, and 1,407 with over 10 years of service with the Company. This is mute, though substantial, evidence of the Company's desire to provide stable and harmonious working conditions for its employes.



Training program, Visalia, California

TRAINING

Historically, the Sprague Electric Company has devoted a large amount of time and money in the training and development of its personnel. This is attested to by the many employes holding management positions at all levels who have been promoted from within the organization.

During 1959 there were over 250 employes pursuing courses of study which will not only provide great personal satisfaction but will broaden their educational base and widen their opportunities for advancement. Additionally, over 253 supervisors and management members are participating in internal supervisory-management development programs.

Currently employes are attending Williams College, Williamstown, Massachusetts; Rensselaer Polytechnic In-

stitute, Troy, New York; University of Massachusetts; University of New Hampshire; Northeastern University in Boston, Massachusetts; Southeastern University, Washington, D. C.; Sinclair College, Dayton, Ohio; Loyola University, Los Angeles, Calif.; Rivier College, Nashua, New Hampshire; and Marquette University, Milwaukee, Wisconsin.

Under the Company's educational sponsorship program, all employes are entitled to assistance after six months of employment, provided that (1) the subject is one that will assist him in his present job or help him toward advancement to another position (2) that the course of study and school offering same is accredited by the Company's Training Department (3) the applicant is approved by his or her department head, the head of his or her activity and the Training Department.

In North Adams and Concord the Company operates an evening school known as the Sprague-Franklin Technical School, with 70 students in North Adams and 46 in Concord. Six of these are Nashua employes who travel to Concord twice weekly. This program offers a one-year preparatory course in mathematics, chemistry, and physics, and a three-year college level course in mathematics, chemistry, physics, AC-DC circuitry and electronics.

Special short courses are presented on a request and need basis. Last year in North Adams a 36-week course in Conversational Spanish was given for the benefit of those employed in our subsidiary, Sprague International Ltd. Also a 16-week course in Mathematics-Statistics was given for those in our Research and Engineering Laboratories and Data



Congratulations, Ashe County, N. C.

and personnel



Processing Department. Both of these courses were led by professors from the staff of nearby Williams College and were Company sponsored. In the past, special courses have been given, in accounting, corporate finance and economics.

The expanding nature of the electronic industry itself, coupled with the Company's philosophy of maintaining its engineering lead, should provide the impetus for ambitious employees to work for their future, through study.

FLIGHT OPERATIONS

The Sprague Electric Flight Department provides a direct and speedy link to major centers of business. The Flight Department, which has been in operation since 1951, maintains four twin-engine aircraft and six pilots. The aircraft are operated daily on a twenty-four-hour basis, transporting Company personnel and products to branch operations, offices, customers, and major Eastern cities.

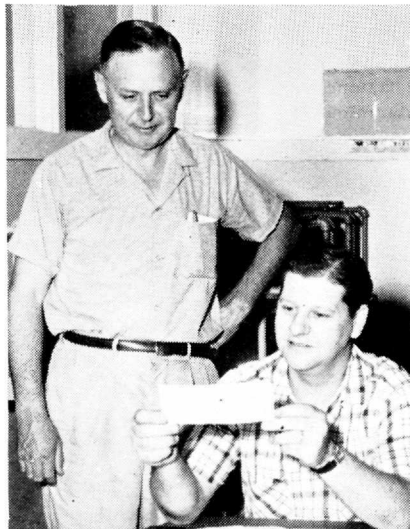
SUGGESTION SYSTEM

The Suggestion Plan provides Sprague Electric employees with an opportunity to participate in the development of their own company. It is worth noting that the U. S. Exhibit in Moscow featured the suggestion plan as one freedom of expression enjoyed by American workers. A suggestion system indeed represents democracy in action.

The root of the suggestion philosophy is the fact that employees are very often more familiar with their assignments than anyone else. Consequently, they are frequently in the best position to develop improvements on their own jobs.

During 1959 the Sprague Electric Company employees submitted approximately 300 suggestions from which over 100 were considered by the Company to be of sufficient value as to warrant an award. The Company paid out to the various participants \$3675, with the highest award being \$150, and the average award amounting to \$34. The national average for awards paid amounts to approximately \$30.

The explosive rate of change in the electronics field keeps the need for ever improving ideas foremost in company's plans. Worthwhile ideas, while always valuable in the electronics industry, have become more precious than ever under the stress and strain of greater competition and higher reliability requirements created by the government missile programs.



Suggestion Award at North Adams

It is with these thoughts in mind that we look forward in 1960, to increased employee participation in our suggestion system.

WAGE AND SALARY ADMINISTRATION

The purpose of Wage and Salary Administration is to develop and maintain an overall consistency among jobs throughout all operations. It is a systemized method to determine what a "fair days' pay" should be for each job.

Job evaluation aids in developing lines of promotion within the Company, hiring, placing, and determining training needs.

Wage and Salary Administration also provides a means of administering merit increases and promotions in a manner most equitable to all employees.

BENEFIT FUNDS

Employee contributions during 1959 to the various Benefit Funds in our system totalled \$29,475.92. The plants operating Benefit Funds are: Ashe County, Los Angeles, Nashua, North Adams, Sprague of Wisconsin, Inc., and Visalia. The newest fund to be set up is at the Visalia Plant where it was started in October 1959. A high percentage of Sprague employees contribute to the various funds as shown: Ashe County, 93%; Los Angeles, 57.5%; Nashua, 91%; North Adams, 85%; Sprague of Wisconsin, 100%; and Visalia, 78%. Concord will inaugurate this program in the near future.

The Benefit Funds have contributed to the support of many charities. Community and United Fund organizations are strongly supported and in communities where there are no community funds individual charities are supported. The following organizations are among those having received funds: Community & United Funds; National Foundation for Infantile Paralysis, Heart Fund, American Red Cross, American Cancer Society, Salvation Army, Muscular Dystrophy Society, Tuberculosis & Health Association and Boy Scouts of America. Of course many of these charities receive donations from more than one benefit fund as each is an independently organized and operated organization.

The first Benefit Fund was organized at the North Adams Plant in October 1949. The reason for such an organization was to eliminate the solicitation of employees within the plant. It also provides a voluntary means of donating a nominal weekly sum which can be automatically

Continued on page 18



Drury High School Students Tour, North Adams, Mass.



Senior Commercial Students Visit Marshall St. Plant.

ELECTRONIC ASSEMBLIES

Sprague Electric Company has been a leader in the development of new families of miniaturized components as new assembly techniques have evolved. A useful measure of the degree of miniaturization achieved with the new techniques is the number of parts that can be contained in a cubic foot of space. The graph below shows how far the industry has come since

PARTS PER
CUBIC FOOT
(RATIO SCALE)

2,000,000

1,500,000

1,000,000

800,000

600,000

500,000

400,000

300,000

200,000

125,000

100,000

60,000

40,000

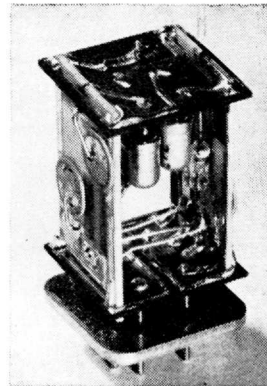
30,000

20,000

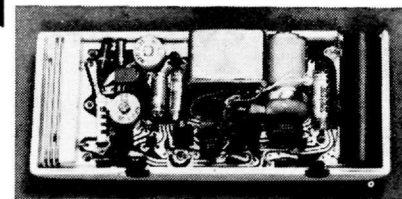
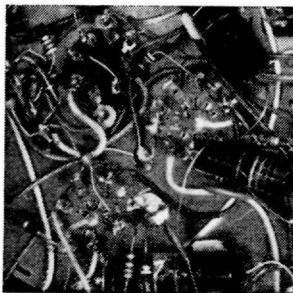
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By 1954, printed wiring boards were being combined with true printed circuits, in which capacitors and resistors are printed on an electrically active base plate that serves as the dielectric for the capacitors. Shown is a printed trigger circuit for a computer, with 2 transistors and 4 diodes enclosed within printed plates carrying 12 other components.



This is a typical circuit composed of discrete components connected by point-to-point wiring.



Printed wiring boards with miniaturized components attached by dip soldering were first introduced about 1950, and have proved very useful when size is a factor. Shown here is a pocket receiver for a personal paging system measuring 2 1/4" x 5 3/4" and containing conventional components mounted on a printed wiring board.

1946

1950

1954

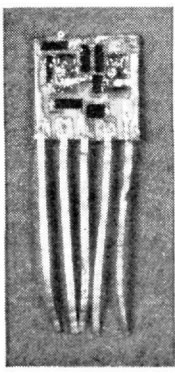
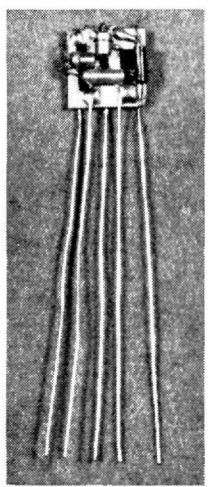
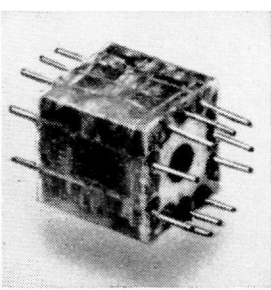
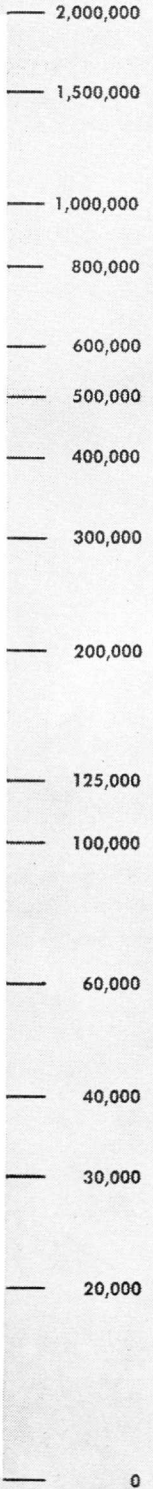
1958

Sprague is supplying both ceramic and tantalum capacitors for the Micro-Modules being developed by R.C.A. for the Signal Corps. This approach is characterized by a disciplined geometry, in which a number of components are printed on wafers .3" x .3" in size, varying numbers of these wafers then being stacked together with vertical connecting wires. The IF Module shown here contains 5 capacitors, 3 resistors, 2 transformers and 1 transistor.

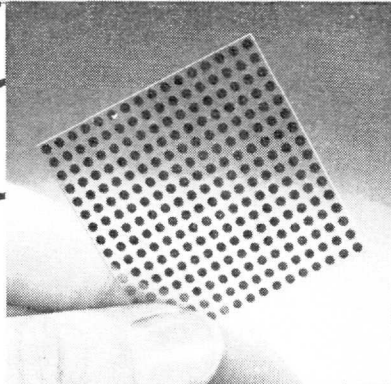
A Look Back and A Look Ahead

1950 in terms of parts density, and pictures typical Sprague components illustrating the various stages of this evolution. It is interesting to note that regardless of the physical form taken by electronic assemblies, the dollar value of components sold to equipment makers continues to grow hand in hand with the increasing complexity of electronic systems.

PARTS PER CUBIC FOOT (RATIO SCALE)



Ceramic-based micro-circuits currently under development in the Sprague laboratories afford even higher component densities than the 1 to 4 components per plate for the Micro-Module. Shown is a binary counter assembly containing 2 capacitors, 8 resistors, 2 transistors and 2 diodes. The transistors and diodes are embedded in the upper right-hand corner of the .5" x .5" ceramic plate.



So-called molecular electronic circuits are made up of electrical functions which are visually indistinguishable as individual parts. By using various techniques such as etching, controlled doping and film deposition, characteristics of capacitance, resistance and inductance, as well as transistor effects, can be created in a semiconductor material to produce simple functional circuits. Another major area under study is the use of ultra-thin films deposited in successive layers. Above is a thin magnetic film memory plane to be used in an advanced computer.

Until about 10 years ago, all electronic circuits were made up of discrete parts, such as capacitors, resistors, transformers and tubes, soldered together in a maze of hookup wire. This technique, known as point-to-point wiring has been in use since the 1920's, and will continue to be used where size is not a critical factor. However, the advent of highly complex circuits of the type used in military airborne electronics and computers has made it necessary to build equipment containing many thousands of parts rather than a few hundred. As a result, the dynamic period of growth in electronics beginning about 1950 has seen many changes in assembly techniques, enabling equipment makers to crowd more and more circuit elements into smaller and smaller packages.

For the future, even more sophisticated methods are under development, with the prospect of another order-of-magnitude increase beyond the highest part density available today. Although limited in application as yet, the use of microcircuitry, "molecular" electronics and the technology of thin films are all areas for further work in which Sprague will continue to broaden its efforts.

After 1953, use of transistors in place of vacuum tubes and development of smaller associated components like the tantalum capacitor brought still further miniaturization. Densities as high as 200,000 per cubic foot were achieved by mounting transistors and miniature tantalum capacitors on a printed circuit plate, as shown in this Sprague 2-stage audio amplifier.

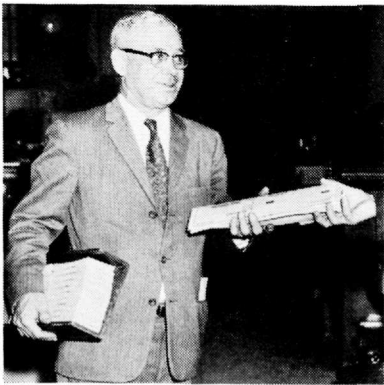
1961 1963 1968

The Sprague Electric Company's Annual

Dave: Gee, Mr. Sprague, I just heard that the Sprague Electric Company's income in 1959 was \$56,733,524. What does a company do with all that money?

Mr. Sprague: Well, you see Dave, Sprague Electric is publicly owned. We make an annual statement to our stockholders and our employes. Let's look at the figures. They will show you how we spent our money during any given year and especially during 1959.

The largest single bill, as in the past, was for wages and salaries. Look here, Dave...



During 1959 we paid our employes a total of \$24,954,711 for their time and effort. This includes production and office employes, technicians, designers, engineers, accountants, buyers, truckdrivers, office managers, salesmen and—yes, even myself. This amount accounts for 44% of

the total amount of money we took in during the year from all sources. You may also be interested to know that this is the largest amount spent on wages and salaries in the Company's 34 year history. But, Dave, this is only the start. Let's look below...

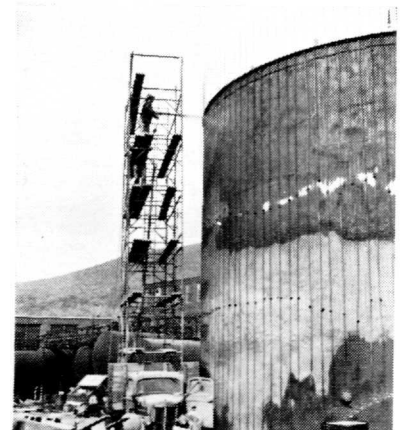


There is one thing that every company must watch very closely, Dave, and that is to provide money or funds to take care of worn out equipment and buildings. Like your home, if the roof begins to leak it must be fixed and paid for and so it is with us. Appliances, trucks, floors, walls and all sorts of things wear out and must be replaced. During 1959 we spent \$1,717,850 just for wear and tear of our present buildings, grounds and equipment. You see, Dave, if we didn't put something away for a rainy day, so that we could fix up or replace these things at once, many of our employes would have to leave work until we could.



Like your own family, we as a big family purchase many items for our daily operation. These items include tools, pencils, foil and cans, waxes and oils, sweeping compound and window cleaning fluid, wrapping paper and boxes, gas for the solder pots, coal for heat and steam pressure,

electricity for lights and power, typewriters, erasers, ditto machines, soldering irons, light fixtures, dollys, trucks, saws, pipe wrenches and ash trays. Yes, Dave, every day in the year we use up over \$59 thousand dollars worth of raw materials, services and supplies or a total of \$21,561,238 during 1959.

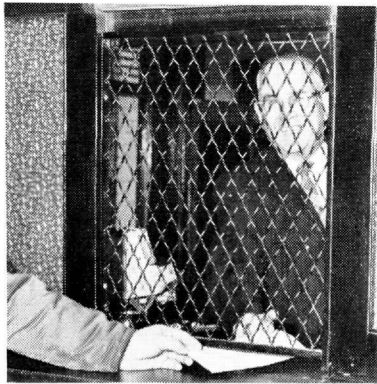
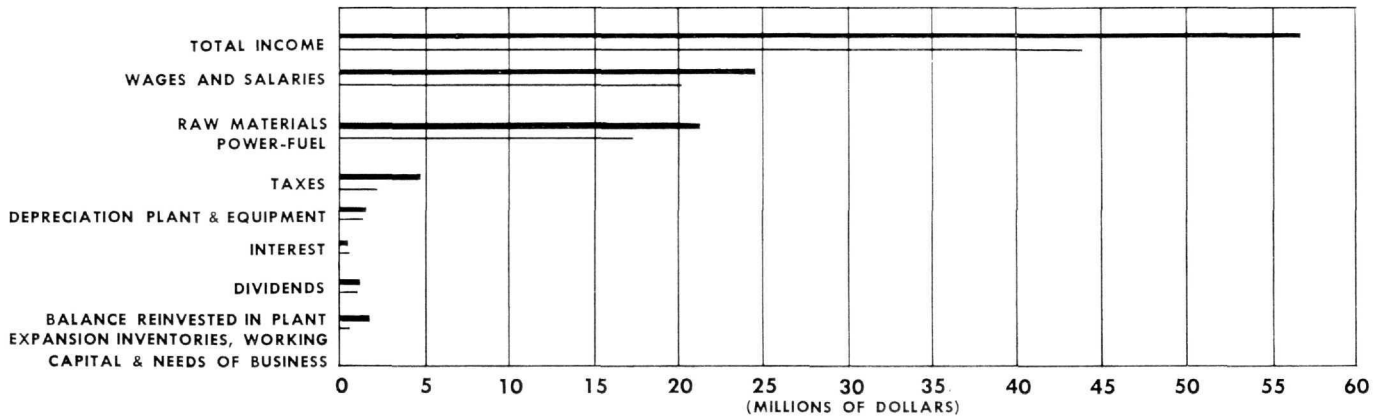


Report To Its Employees



Here's the picture for the past two years — what we took in and the proportions in which it was distributed...

1959 _____
1958 _____



Just like anyone else, Dave, we have to pay local, state and federal taxes. These include property, equipment, social security, unemployment, corporation taxes and many others. In 1959 this cost the Company \$4,933,785. This money we pay in taxes goes to build new schools, highways and parks, care of the aged

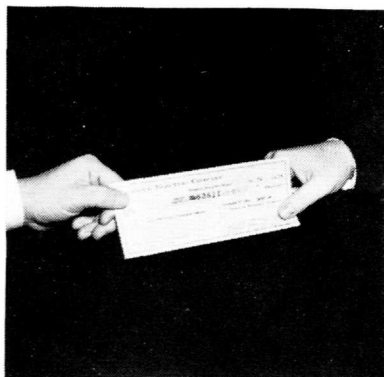
and unemployed, and provides many other privileges we as Americans have come to expect.



Well, that's the story. After all these expenditures we have \$1,947,339 left to meet emergencies, and for cash on hand. This is only 3½% of our income. Let's look above and see how we made out in comparison with 1958.

It may seem strange to you, Dave, that a company as big as Sprague Electric has to borrow money and thus pay interest the same as anyone else. Well, we sometimes need money to expand our facilities or to meet bills at the end of the month or for other purposes.

In interest we paid \$63,612 during 1959 for the privilege of using the money loaned us. Maybe some of this money was from your savings which the bank invests.



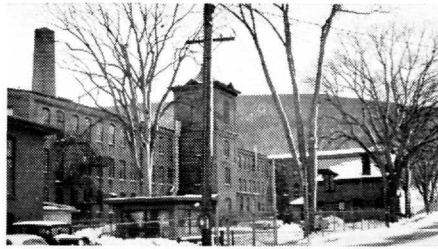
In 1959 we paid our stockholders \$1,554,989. You see, if we didn't pay them for using their money, they would go elsewhere to buy shares and frankly, we couldn't stay in business without them.

Dave, a stockholder may be anyone, even a little girl like the one in the picture. They are people who have invested their savings, foregoing the pleasure of using that money now, with the hope of gaining in the future.

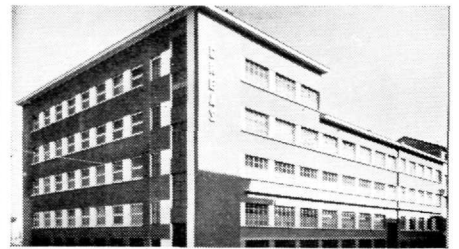




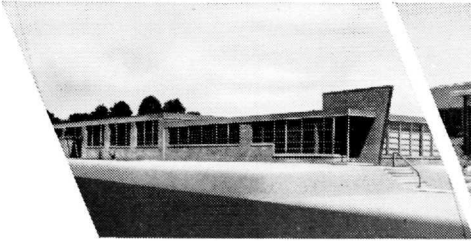
ROCK OF AGES CAPACITORS, INC.
Barre, Vermont



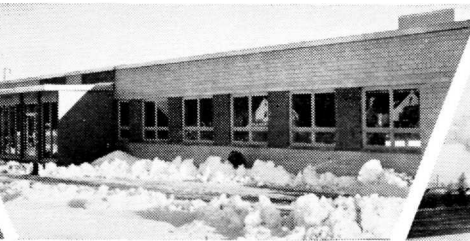
BROWN STREET PLANT
North Adams, Massachusetts



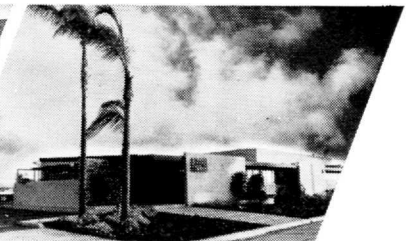
CREAS
Milan, Italy



GRAFTON
Wisconsin



CONCORD
New Hampshire



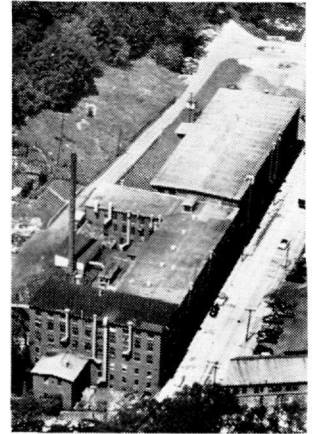
LOS ANGELES
California



UNION STREET PLANT
North Adams, Massachusetts



Executive Offices - Manufacturing - Service Departments
Marshall Street, North Adams, Massachusetts



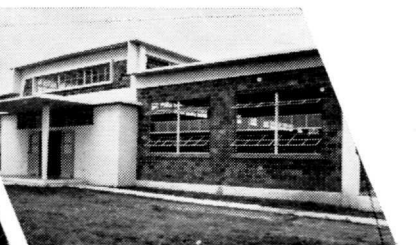
BEAVER STREET PLANT
North Adams, Massachusetts



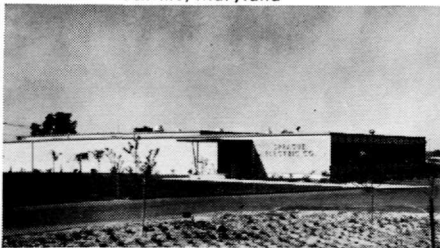
DYNACOR, INC.
Rockville, Maryland



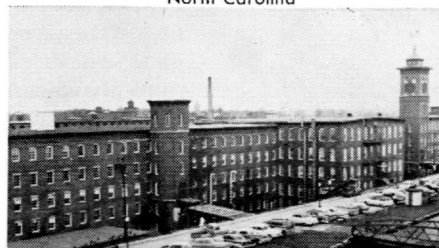
ASHE COUNTY
North Carolina



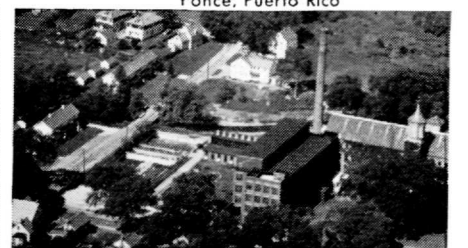
SPRAGUE CARIBE
Ponce, Puerto Rico



VISALIA
California



NASHUA
New Hampshire



BENNINGTON
Vermont

Production facilities



The Sprague Electric Company was incorporated on June 1, 1926. Its original home was the Robert C. Sprague Family home in Quincy, Massachusetts. The business later moved to larger quarters in Quincy and in 1930 it was necessary to find even larger quarters.

1930 BEAVER STREET PLANT—NORTH ADAMS, MASS.

The first property purchased in North Adams was the Beaver Street plant, which has 142,510 square feet of floor space and at one time contained all of the Sprague facilities. The plant now manufactures a wide variety of capacitors, with supporting Research and Engineering laboratories and the Can Shop and Plating departments. Robert S. Teeple, Factory Manager, has general supervision over the plant with its 425 employees.

1937 BROWN STREET PLANT—NORTH ADAMS, MASS.

In 1937 the Company purchased the Brown Street plant, with 143,726 square feet of floor space for the fabrication of Prokar, Industrial Oil and Mica Capacitors, Resistors and Networks and with appropriate labs. Five hundred and twenty-nine persons are employed at Brown Street, over which Mr. Frederick H. Potter, Factory Manager, has general supervision.

1944 MARSHALL STREET PLANT NORTH ADAMS, MASS.

The Marshall Street plant was purchased in 1944. Within its 30 buildings which contain 709,525 square feet of space are the Company's Executive Offices, the general Research and Engineering Laboratories, Principal Service Departments and extensive manufacturing operations. General supervision of the manufacturing operations is under Mr. Frederick H. Potter and Mr. Robert S. Teeple, Factory Managers. Mr. John B. Ortman is Manager of Plant Engineering Services. Two thousand and nineteen persons are employed at Marshall Street in its various operations.

1945 ROCK OF AGES CAPACITORS INC.—BARRE, VERMONT

Rock of Ages Capacitors, Inc., with 385 employes, has been operating by sub-contract from the Sprague Electric Company since early 1945. Under this arrangement Sprague supplies raw materials, equipment, and technical and production knowledge. Currently, the plant produces molded and paper tubular and POD capacitors. Mr. Frederick S. Ralph is Factory Manager.

1946 SPRAGUE PRODUCTS COMPANY, NORTH ADAMS, MASS.

The Sprague Products Company is the sales organization for the sale of our products to distributors, wholesalers and jobbers across the country. Mr. Harry Kalker is President of this Company which employs 127 persons with 24 sales offices and sales representatives and became a wholly-owned subsidiary in 1946.

1948 SPRAGUE OF WISCONSIN, INC.

Sprague of Wisconsin Inc. in Grafton, Wisconsin, was acquired in 1948. The present facility at Grafton, built in 1953, currently employs 97 persons with Mr. Harry W. Rubinstein as President. The Wisconsin products are ceramic and hermetically sealed metal cup capacitors.

1949 NASHUA, NEW HAMPSHIRE

The staff and production force of our largest branch plant, Nashua, is comprised of 829 employes. Located in the heart of the city the buildings contain 202,015 square feet of space. Mr. Alvin L. Schils, Factory Manager, has responsibility for an assortment of production lines including metal clad paper, mylar wrap and ceramic capacitors, printed circuits, resistors and amplifiers.

1951 BENNINGTON, VERMONT

In 1951 the 51,100 square foot Bennington plant was purchased. Under the supervision of Mr. Potter, Factory Manager, 35 employes carry out the production of Ceroc[®], Ceron[®] and Tetroc[®] Coated wires.

1953 ASHE COUNTY, NORTH CAROLINA

High in the Blue Ridge Mountains is located one of the more modern plants of the Company with 82,651 square feet of space. Under the factory management of Mr. Urle Sheets and with an employment of 538 persons the plant has a complete manufacturing process for various lines of dry electrolytic capacitors.

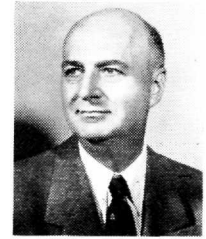
1953 SPRAGUE INTERNATIONAL, LTD., NORTH ADAMS, MASS.

Organized in 1953, Sprague International, Ltd., is the Company's export sales facility for Sprague components in the Western Hemisphere and Mr. William M. Adams is President. The main office is located in North Adams and has a staff of 13 employes.

1953 SPRAGUE CARIBE COMPANY, PONCE, PUERTO RICO

Founded in 1953, Sprague Caribe is a wholly-owned subsidiary located in Ponce,

Puerto Rico, with floor space of 22,000 square feet, manufacturing molded tubular capacitors. Total employment of 160 is under the general managership of Mr. William J. Cunningham and the Presidency of Mr. William M. Adams.



Ernest L. Ward

1955 LOS ANGELES, CALIFORNIA

Completed in 1955 its 12,000 square feet is devoted to sales and field engineering activities for the West Coast, radio noise filter design and development and the West Coast Sprague Products Sales Offices. These various activities have an employment of 46 and come under the supervision of Mr. George H. L. Norman for Sales; Mr. R. W. Woodbury, West Coast Sales Manager for Sprague Products; and Mr. James LeGette for Field Engineering.

1956 CONCORD, NEW HAMPSHIRE

Originally started in 1956 with a 32,000 square foot building, Concord has since increased in size to 78,900 square feet. Two new products account for this growth, solid tantalum capacitors and electro-chemical switching transistors. The plant, now employing over 800, is under the general managership of Mr. Robert L. Parrish.

1956 CREAS, MILAN, ITALY

Purchased in 1956, the physical property consists of 45,000 square feet of space. Mr. Giacomo Giacomello is President of CREAS which currently manufactures electrolytic capacitors. Employment is 181 and its effort is primarily for supply of components to the European commercial electronics field.

1956 DYNACOR, INC.

Acquired in 1956, Dynacor recently moved to its new 11,000 square foot quarters at Rockville, Maryland. The plant manufactures bobbin tape cores for computers and tape cores for magnetic amplifiers. Mr. Carroll W. Lufey is President of the organization which currently employs 70 persons.

1959 UNION STREET, NORTH ADAMS, MASS.

This 112,300 square foot building is the home of the Special Products Division which currently employs 293 persons in the manufacture of computer magnetic

Continued on page 19

Sprague's national marketing organization



Neal W. Welch

In 1959 the Sprague Electric Company sold \$56,733-524 worth of electronic material and engineering services to companies both large and small in the United States and all over the world. This was a marked increase from our 1958 sales of \$43,538,109. In 1960, we hope to exceed our 1959 sales by a substantial margin. To achieve this target, the Sprague marketing organization must find customers for our products and skills, convince these customers that Sprague components and services are better-suited to fill their particular needs, and instill in them the thought that Sprague is the best source to fill all, we hope, of their future requirements.

This is no easy task when you consider that we have over 200 competitors continually visiting our customers and attempting to convince them that they can do everything that Sprague does—only better, faster, and at a lower price. Our sales effort has been more successful than that of our competitors, as shown by our ever expanding line of products and our increasing sales volume over the years. To achieve our 1959 sales volume, we actually furnished to our customers 154,256,977 individual electronic components, plus thousands of pounds of magnet wire and thousands of hours of engineering consulting time and research.

The electronic and electrical products we sold consisted of paper, film, ceramic, tantalum, mica, and other capacitors; carbon-film, precision wirewound, power wirewound, and high voltage carbon-

element resistors, surface-barrier, micro-alloy, and micro-alloy diffused-base transistors; radio interference filters; pulse-forming networks; ceramic-insulated and Teflon[®]-insulated magnet wire; pulse transformers and switch cores; magnetic shift registers; various types of packaged components and electronic subassemblies; ceramic-base printed networks; toroidal coils and inductors; precision ratio transformers; etc.

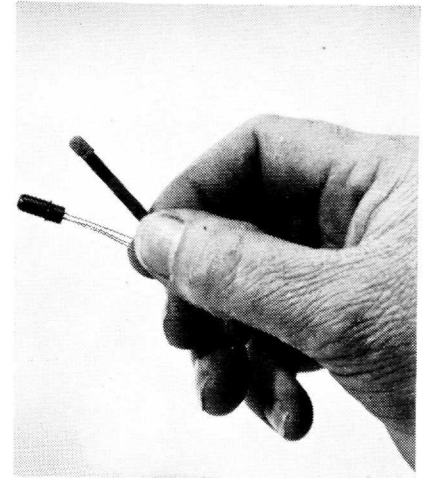
The names of these parts are not on the tip of the tongue of most people. They are specialized items for the highly technical market of the expanding electronics industry. And they are not simple products to sell! You won't find them on the shelves of the corner store. Buyers are discriminating and there are many customer specifications which must be met in addition to our own high quality standards.

Our roster of customers includes all of the famous names in the electronics, electrical appliance, automotive and aircraft industries, and many you may never have heard of, each of whom is equally important to us if we are to achieve our total sales volume. We sold our products to 2000 customers in all during 1959. There is hardly a company of any size in the electronics industry in particular which does not purchase either directly from Sprague Electric or through the industrial parts distributors which are supplied by our subsidiary, the Sprague Products Company.

From TV sets to outer-space vehicles, from electric shavers to missiles, from food mixers to giant electronic computers are the wide fields in which Sprague Electric components are used.

Today, service is an essential part of selling and he who gives the customer the best service most often gets the order in a closely competitive market. To furnish this service requires many trained men, much energy, and a substantial expenditure to keep these men supplied with the sales and technical ammunition they need. And these are in vain if we did not meet delivery promises with top-quality products.

First on the customer firing line are the resident sales engineers we have in some 23 sales engineering offices in every major electronics marketing area across the country. Our primary sales offices are located in Boston and North Adams, Mass.; New York City and Great Neck, N. Y.; Camden, N. J.; Cleveland, and Dayton, Ohio; Washington, D. C.; St. Louis, Mo.; Chicago, Ill.; Clearwater,

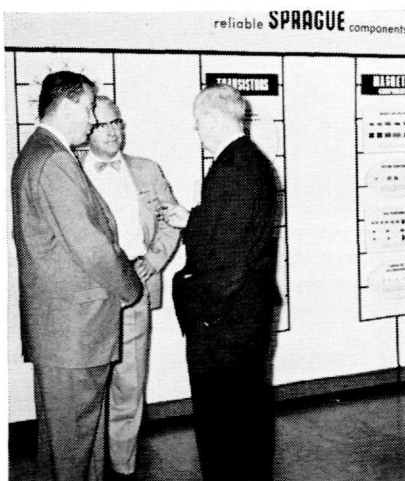


Transistor

Fla.; Atlanta, Ga.; Los Angeles and San Francisco, Calif.; Detroit, Mich.; Dallas, Texas; Minneapolis, Minn.; Birmingham, Ala.; Denver, Colo.; Albuquerque, N. Mex.; and Salt Lake City, Utah. There are actually two offices in Atlanta and Dayton, each handling different products.

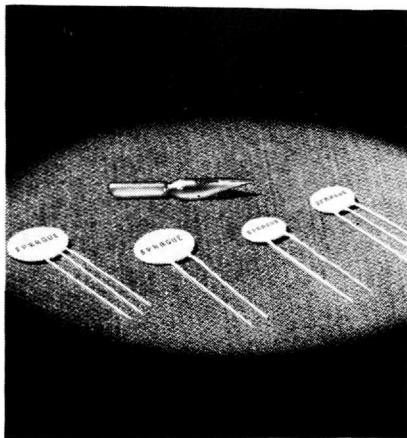
Some 75 sales engineers work out of these offices, ringing doorbells, so to speak. Theirs is the responsibility for locating and securing every available dollars' worth of business to keep our factories humming so that your pay check will reach you regularly. The overwhelming majority of these men are graduate engineers, and those who are not, grew up with the industry or else have had other equivalent technical training.

They call not only upon plant executives and purchasing personnel, but also upon the component engineers, design engineers, and the quality control personnel. They provide our customers with the essential technical information for the design of our parts into end equipment. They assist our customers in preparing drawings and specifications, as well as in writing test procedures to see if products meet the specifications. They disseminate by word of mouth, as well as by printed technical literature, news of our developments and improvements in the various fields of the electronic and electrical components industry. They must be, as far as possible, men who not only understand our customers' requirements and how our products fit them, but men who also speak the language of both our customers' technical personnel and their purchasing personnel...and these often live in two different worlds.



Recent Trade exhibit

extends from coast to coast



Ceramic Capacitors

Further, these sales engineers are responsible for feeding back information. They keep us advised from the field on what our competitors are doing, how their products are performing, what our products are doing, field troubles of both our products and those of our competitors, possibilities of business in new components which might fit into our line, methods of expediting shipments, changes in key customer personnel, etc. In other words, they are also the basis of our market intelligence service.

But our field men, alert as they are, cannot know everything about every product. Consequently, to back them up, we have a group of more than 25 product specialists who can go out in the field, when necessary. These engineering product specialists, most of whom are located in North Adams and others of whom are stationed in the field, have a most detailed technical knowledge of the specified products to which they are assigned. They are the men with the most comprehensive application engineering knowledge. Sprague Electric has the largest force of these specialists in the electronic components industry. They are a real plus in our selling effort.

This customer technical service has proven so important that we have been expanding our effort in this direction year by year as we have found that it has "paid off" very materially in increased sales, better customer relations, and less misunderstandings as to what our products will and will not do.

One field in which we have a very interesting and unusual expansion of our technical selling effort is the extremely complex one of electronic interference reduction. The Sprague sales organization maintains three separate laboratories—North Adams, Dayton, and Los Angeles—to make measurements of radio

interference from electronic and electrical equipment. These Sales Department Laboratories also act as their own production engineering sections to design the noise filters which we recommend for purchase to our customers. They also have their own long-range research and development groups. In addition, members of the Interference Control Field Service Department laboratories visit our customers to make measurements of interference from actual equipment on airplanes, in missiles, in tanks, etc., in order to recommend the best way of suppressing this noise. All in all, Sprague Electric has a force of more than 20 field specialists to handle this technical sales effort as well as a supporting group of 46 draftsmen, technicians, laboratory and office personnel. And all are members of the Sales Department!

Another marketing area on which Sprague has very intensively concentrated sales effort is military electronics. The Army, the Navy, and the Air Force all have various groups which write standards and specifications for the products we make. In addition, the Armed Forces Electro-Standards Agency writes Military Specifications and Military Standards for these products where there is a joint service use. Consequently, we have assigned qualified sales engineering personnel in North Adams, Washington, and Dayton to call regularly upon key government agencies. Our men have the responsibility for working with government personnel to make certain that we receive every opportunity for participating in the joint writing by industry and the armed services of Military Specifications and Standards, as well as for furnishing data to government technical personnel on which they can base individual service specifications for special components.

It is most important to us that we are aware of the quality requirements for the complex military gear purchased by the government for use in the national defense effort. In this field, Sprague has been a leader and has often produced components far above and beyond the current military specifications. The substantial contribution which the Sprague Electric Company has made to the defense effort and much of our military business are due, in no small part, to the experienced key Sprague personnel who have worked so closely with the military in developing our highest quality product lines.

In North Adams is located the communications hub of the Sprague sales or-

ganization—the sales order office. All orders received in the field ultimately reach the sales order office so that they may be processed, entered, and prepared in the proper form to be sent to the production departments. The key men in the sales order office are some 15 account specialists. To handle our customers' orders and inquiries, our account specialists also deal with production engineering and production control and factory personnel so that they can get the answer quickly to the questions our customers pose on such diversified subjects as specifications, exceptions, returns, credit, deliveries, traffic and shipping problems, etc.

To back up this force of sales specialists in our offices, some 150 assistants take care of the myriads of details. The speed and accuracy with which they do their tasks is just as important as the work of the sales engineers and the account specialists.

Thus far, we have only mentioned our primary selling organization. But there are other organizations in our total marketing effort. For example, the Sprague Products Company (our distributors' supply subsidiary) warehouses, packages, and sells to parts jobbers and distributors all over the country. This is done through its own 24-office, 80-man selling organization, selling Sprague replacement parts for radio, TV, and industrial electronics, as well as many industrial electronic components. Our industrial distributors, in particular, furnish ready local sources of pilot quantities of popular ratings of the many Sprague industrial and military electronic components, such as capacitors and resistors, to meet the immediate

Continued on page 16



Trade show in Chicago



overnight needs of our O.E.M. (original equipment manufacturer) customers. The selling of the O.E.M. market through distributors has mushroomed in the past few years and is a very important trend throughout the electronics industry. It is important for all of us to make certain that high quality parts are furnished to our distributors, since these parts may be used in prototype equipment as well as for test and evaluation purposes unbeknownst to us. All in all, the Sprague Products Company has over 1000 distributors, both replacement parts and industrial, from Maine to California. Each distributor has a sales force of his own to help move our products to their final destination. A small distributor may have only one salesman but the largest we know of has over 50!

Sprague also manufactures industrial power factor capacitors. Since these capacitors are used in industry in general, they are not sold through our primary sales offices for the electronics and electrical industries. These capacitors are sold, instead, through an additional 30 sales representatives, who have more than 90 sales engineers on their staff.

Our subsidiary, Sprague International, Ltd., with headquarters in North Adams, has its own selling force with representatives in both North and South American outside of the United States. The Sprague World Trade Corp. in Zurich, Switzerland has its representatives covering every country in Europe. The Overseas Operations Department of the Sprague

Electric Company in North Adams also has representatives in other countries in the world where Sprague International and SpragueWorld Trade do not operate. These sales organizations have been constantly increasing the flow of Sprague components into foreign markets. Their effort is truly a difficult one as foreign industrialization programs increase the output and quality of foreign-made components.

To provide fast service to our growing overseas markets, we have purchased CREAS, a capacitor manufacturer in Milan, Italy. CREAS, which has its own selling organization in Italy, also markets its products in other countries in Europe through the Sprague World Trade organization. Since Italy is within the European Common Market, we have great expectations for the future of CREAS.

To present technical information on our products to our customers in tangible form is the responsibility of another branch of our marketing organization, the Advertising and Sales Promotion Department. Not only does this department, which is headed by a graduate engineer, plan and coordinate the basic advertising campaign in every major trade magazine in the fields in which our products are sold, but it works closely with our two advertising agencies, directing their efforts, checking, writing, and rewriting copy and often revising and furnishing our own layouts for the finished advertisements.

Our Advertising and Sales Promotion Department also prepares, in cooperation with other groups within our marketing organization and production engineering and research and engineering departments, engineering bulletins and catalogs which detail the performance characteristics as well as the standard ratings and physical sizes, mounting details, etc., for the hundreds of thousands of items listed in a 3-inch thick stack of technical literature.

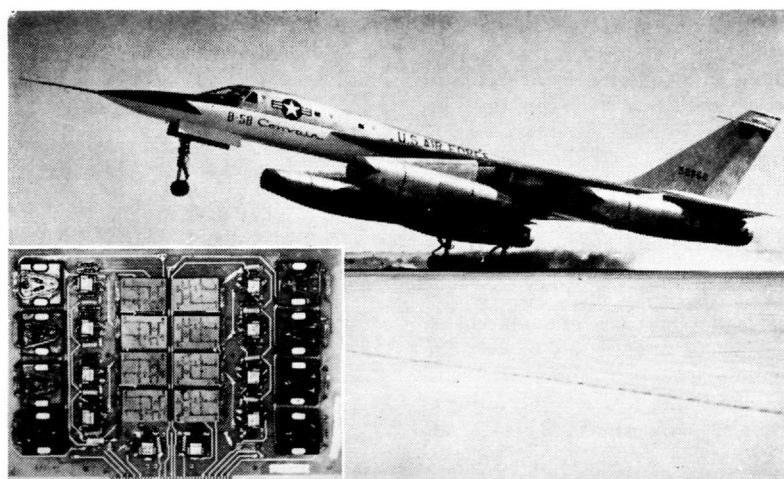
Our policy of furnishing more technical information on our products and more detailed information than any of our competitors do has been most effective. Our major competitors have all attempted to emulate us but not one has been able to carry through effectively on this complex task which Advertising and Sales Promotion has been carrying out as a routine function.

Sprague Electric Company and its subsidiaries participate in approximately 20 trade shows and conventions during a year. The A&SP Department designs the exhibits for all these shows, has them built or remodeled as the case may be, and makes the necessary arrangements for erection and dismantling of exhibits. Major shows are staffed by A&SP personnel as well as by personnel from our district offices and by our product specialists. In addition, displays are furnished distributors, schools, colleges, and for community relations purposes in the various cities in which we have plants.

Here then is a brief summary of the basic selling organization which does such a big job in selling the products made by people in the Sprague factories to customers in the electronic industry all over the world.

While we like to think that our 200-odd American competitors are not as active and intensive in their selling effort as we are, we are a target for everyone of them and foreign competition as well. Sprague sales personnel have been imbued with the consciousness of the serious intention of our competitors to take as much business as possible away from us. The marketing organization is no stronger than production's ability to meet customer delivery requirements at competitive prices and engineering's ability to keep us well ahead of our competitors with new products and engineering know-how!

Each member of the Sprague team must do his part to keep us on top and to permit us to continue to grow.



Insert photo shows magnetic shift registers and transistor "flip flops", both produced by the Sprague Electric Company, used to form a part of the plug-in-boards for electronic equipment furnished to Convair, Fort Worth, Texas by Melpar, Inc., for use in the USAF B-58 bomber, also shown. The development of the huge bomber, capable of supersonic speeds, is receiving engineering assistance from Sprague engineers.

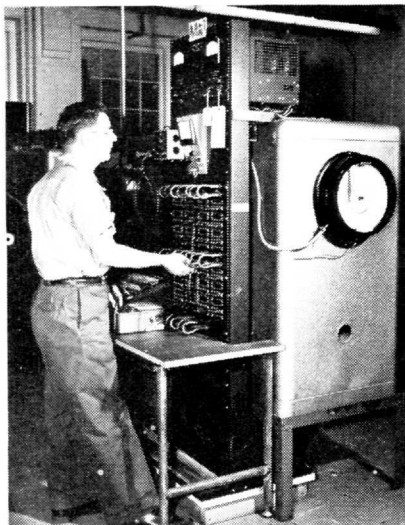


Certainly, everyone, at least once in their life has had the unfortunate experience of spending good money for an article of clothing, a household appliance, a piece of hobby equipment or any other sort of useful item that just didn't do the job. Perhaps it was poorly made, having loose or missing parts, or maybe it was made of unsuitable materials. At any rate, what other reaction can be expected on the part of a person making the discovery of such a situation besides extreme displeasure?

Manufacturers are acutely aware of the customer ill-will that these occurrences can create. Since considerable sums of money are spent by manufacturers to promote their products and to enhance customer good-will, it can be puzzling to consider how much of this expensive effort is wiped out by a few instances of a poor product getting into the hands of customers.

Enlightened manufacturers have prepared against possibilities like these by installing a scientific means of prevention of defective products. This scientific means is called Quality Control.

The Sprague Electric Company, although it does not manufacture products for direct sale to the ultimate consumer, nevertheless has a vital interest in Quality Control. This interest exists for two reasons. The first and most obvious reason is that our customers' requirements directly or indirectly demand it. Our customers, the manufacturers of radios, television sets, refrigerators, etc., will not stand for risking the loss of their customers' good will because of malfunctions which were caused by substandard parts from us. This is even



Testing Tantalum Capacitors, Marshall St. Plant, No. Adams, Mass.

more true in the case of equipment for National Defense. As a result the Military Services contractually require their suppliers to have Quality Control systems.

The second reason for Sprague's interest in Quality Control is a matter of economics. It is somewhat of a paradox but nonetheless a fact that the efforts expended in a modern Quality Control program result not only in the receipt by customers of uniformly satisfactory product, but also reductions in waste of materials, time and money caused by scrap and rework. Many Quality Control Programs in industry have paid for themselves several times over by the savings in scrap and rework costs alone.

Quality is controlled basically by:

1. Setting standards for product performance.
2. Measuring conformance to these standards.
3. Taking corrective action when evidence of nonconformance is discovered.

It can be readily seen that the above is little more than applied common sense. The emphasis, however, in modern Quality Control is on prevention rather than trouble-shooting.

The start can be made at the very beginning, the design stage. It is very useful to a designer to have factual information on what tolerance the process he is going to call for can hold. To manufacture a good product, we must have materials that conform to our specialized requirements. Quality Control's job is to verify that our suppliers have done their job.

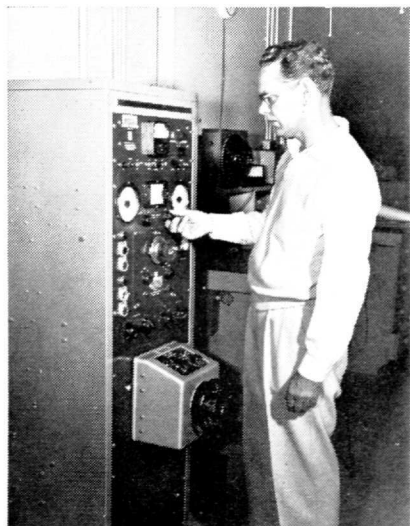
The responsibility for the quality of a product rests on its maker. Our manufacturing departments must take the

materials furnished by our suppliers and fabricate a finished product with the quality built in. Quality Control's role is to verify at each step of manufacture that the quality was indeed built in.

Final inspection of the finished product provides the last link in the chain of safeguards in the interest of our customers. A rigid inspection of each lot of outgoing material supplemented by special tests such as extreme temperature, humidity, vibration and life assures consistent high quality of the material shipped to our customers.

Information is channeled to our Quality Control engineering group from all sources ranging from inspection data of materials upon receipt, all the way to the reports sent us by our customers on how we rate as a supplier. This information must be interpreted, summarized, and reported to our management and operating personnel so that quality problems of a longer term nature can be resolved. Special investigations into quality problems are made by Quality Control engineering.

There is no magic formula that assures continued high quality of a product. Eternal vigilance has often been quoted as the price of liberty. Without disputing that, we can certainly say that it is a necessary ingredient of a high quality product. It is only by painstaking attention to every detail from beginning to end of manufacture, exhaustive inspection and test of the completed product, and unvarying pressure for correction of discrepancies that Sprague is able to maintain its preeminence in the electronic component industry.



Vibration testing, Los Angeles Filter Laboratory



Electrical performance test of Switching Transformer, Union Street Plant, North Adams, Mass.



Assembly and Rolling Dept. Brown Street Plant, North Adams, Mass.

Emp. and Com. Relations

Continued from page 7

withheld from each paycheck. This makes the giving easier, yet when contributed it yields a more useful lump-sum donation.

It is noteworthy that during the eleven years the Fund has been in existence in North Adams, \$173,732.02 has been contributed.

SANTA FUND

The Santa Fund, which is co-sponsored by the North Adams Sprague Management Club and the North Adams Transcript, has been a resounding success since it was inaugurated in 1958. The 1959 drive wound up its activities on December 23rd and 24th with the delivery of toys to children of needy families in the Northern Berkshire Area.

The toys were purchased with money donated through voluntary contributions. \$1,070.33 had been donated by employees and other generous area residents. Toys were also contributed, some new, others used.

The toys were wrapped and labeled in wrapping bees with Management Club members donating their time. The list of children who might not otherwise have enjoyed a Merry Christmas was compiled with the help of area clergy, police, and welfare groups. When the last shout of joy had died away, 803 children in 205 families had received presents.

RECRUITING

Recruiting of professional people has become increasingly important in many companies during the past few years. Here at Sprague Electric we have a team of recruiters who visit twenty eastern colleges in a concentrated effort to obtain the best available college graduates as potential employees.

Recruiters travel to the various colleges during the winter and spring months to personally talk with senior students. Interested and capable students are invited to the various plants where they may be further interviewed in a more technical manner. If, at the conclusion of these interviews it is felt that the student has the potential for our type of work, and the student is interested in joining Sprague Electric, he is offered a position.

Many factors such as scholastic ability, general attitude, and participation in extra-curricular activities must be considered.

It is not by chance that we have the largest research and engineering department of any electronics firm of our size. We feel that we have many opportunities to offer the new college graduate. Our recruiting program has been successful and will, without a doubt, be expanded even further in the years to come.



Employee Relations and Personnel Conference, North Adams, Mass.

SPORTS PROGRAM

A variety of sports activities are participated in by Sprague employees through the encouragement of the Company's Employee and Community Relations and Personnel Departments. These activities vary from fishing contests to volleyball tournaments.

At the Nashua, New Hampshire; Ashe County, North Carolina; and the North Adams plants the fishing contests are very popular with men, women and children participating.

Bowling is the most popular of the extra-curricular activities by Sprague employees and has the most followers. Nashua employees have a men's team in the Industrial League and men's and two women's teams in the Nashua City Office League. Visalia, California plant employees also with high bowling interest, have one men's and two women's teams in the Industrial League. The Concord, New Hampshire employees follow bowling closely with both men's and women's teams in another employee-only league. At the North Adams plants 14 men's and 16 women's bowling teams are one of the major winter sports attractions of our employees.

Employees at our plants at North Adams, Concord, Visalia and Puerto Rico all have softball teams. There are ten teams in the North Adams league and at Visalia a men's and a women's team are in the Visalia Recreation Department League. Concord has a men's team in league competition while Puerto Rico has an inter-plant league.

Golf draws many enthusiasts at the Concord, North Adams and Nashua plants. Basketball teams are active at Puerto Rico and Nashua, with volleyball and an inter-plant tournament at Puerto Rico and at the Los Angeles operation. Sprague of Wisconsin, in Grafton, has

horseshoe pitching available during rest period breaks and lunch periods.

At Ashe County, Nashua and North Adams employes provide adult leadership in Little League Baseball with many employes' children participating in and greatly enjoying this favorite American pastime.

PUBLICATIONS

The Publications Department publishes the Sprague Log for the North Adams, and Bennington, Vt. plants in addition to the following monthly branch plant papers: Sprague Telecast, Nashua, N. H.; Sprague Concordian, Concord, N. H.; Sprague Topics, Ashe County, N. C.; Sprague Pacific, Los Angeles and Visalia, Calif.; and Sprague Teleneews, Sprague of Wisconsin, Inc., Grafton, Wisc.

Many other publications are issued from the department such as employe handbooks; insurance, safety, training and recruiting booklets; newspaper releases, employe relations and personnel forms, and Employe and Management Newsletters.

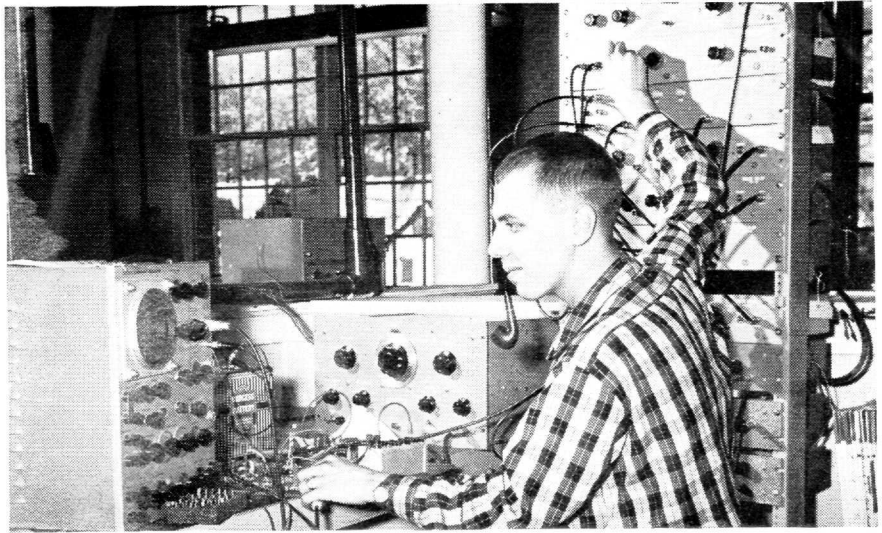
Research

Continued from page 5

of component building blocks.

The progress made through research is revolutionary and evolutionary in the most profound sense. The coming of the transistor was a surprising event that could not have been predicted very far in advance, but that is typical of our age of ever-accelerating research. In the life span of most of us, we have seen one dramatic development follow another, almost without pause, and the attainment of one goal seems almost inevitably to suggest the vision of several goals to come.

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Design improvement project—Marshall Street Laboratories, North Adams, Mass.

Production Facilities

Continued from page 13

components, semi-conductor digital circuit assemblies and tantalum assemblies under the managership of Mr. David B. Peck.

1958 VISALIA, CALIFORNIA

Constructed in 1958, this modern one-story building of 22,000 square feet now houses the Company's West Coast production facilities for noise suppression filters, computer magnetic components, semi-conductor digital circuit assemblies, and the storing, stamping and finishing of metal clad paper and solid tantalum capacitors. This operation, currently employing 144, is under the factory managership of Mr. Martin J. Daigneault.

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Sprague Electric's First National Magazine

You have just finished reading the first issue of the "National" Sprague Log. It represents many hours of planning, thought, writing and layout by the Publications Staff and the various departments who submitted articles. It is our hope that we have provided the broadest possible coverage of stories and events which would be of real and lasting interest to you.

Since this is our first magazine issue, we would sincerely appreciate any comments you as the reader may have. Suggestions will help to create a more informative and interesting publication in the future. Please send your suggestions to:

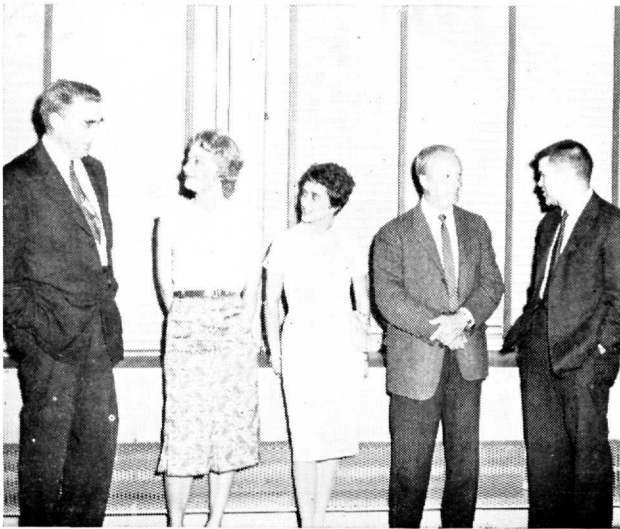
Publications Department
Employe & Community Relations
SPRAGUE ELECTRIC COMPANY
North Adams, Massachusetts



Emission Spectrograph for analysis of raw materials, Marshall St. Laboratories, North Adams, Mass.

"In Your Hands"

The white gloved hands on the cover dramatically depict the constant awareness by the Sprague Electric Company of the absolute necessity for higher and higher reliability of production. In these hands are solid tantalum capacitors produced at the Concord, New Hampshire operation and used in the Convair Atlas, USAF Intercontinental Ballistic Missile pictured in the background.



Graduates of Conversational Spanish Course with their instructor (right) at North Adams, Mass.



Mr. R. C. Sprague meets Business-Education day guests in his office, North Adams, Mass.



Men's Bowling League Champs, Nashua, New Hampshire - winners in one of our most popular sports



Presentation of Correspondence Course Certificate, North Adams, Mass.



Published by



Employe and Community Relations

Sprague Electric Company

Marshall Street

North Adams, Mass.

