$|a+b| \leq |a| + |b|$

$$\left(\frac{A}{B+C} \neq \frac{A}{B} + \frac{A}{C}\right)$$

$$\Psi = \begin{vmatrix} 1S(1)\alpha(1) & 1S(2)\alpha(\\ 1S(1)\beta(1) & 1S(2)\beta(\end{vmatrix}$$

$$N = N_0 e^{-\lambda t}$$

$$\dot{B}_2 = \text{curl } E$$

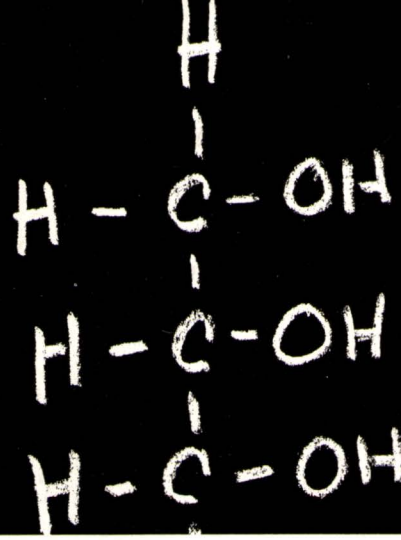
$$\dot{D} + J = \text{curl } H$$

$$\text{div } B = 0$$

$$\text{div } D = \rho$$

$$\frac{\partial \rho}{\partial t} + \text{div } J = 0$$

$$F(s) = \int_0^\infty f(t) e^{-st} dt$$



$$H = -\left(\frac{h^2}{8\pi^2 m}\frac{d^2}{dx^2}\right) + \left(\frac{k}{2}x^2\right)$$

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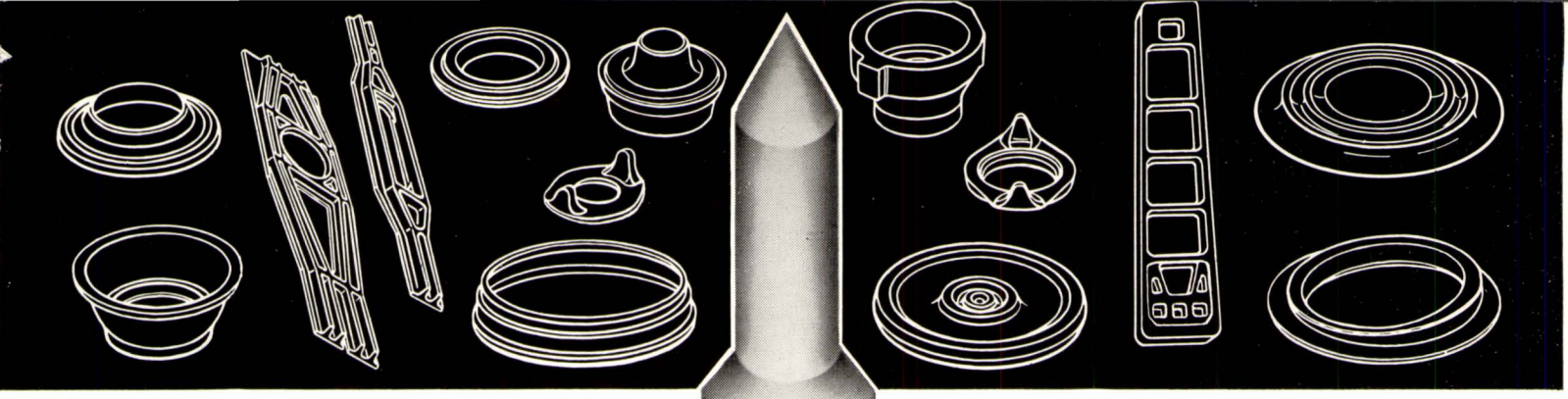
$$E = IR$$



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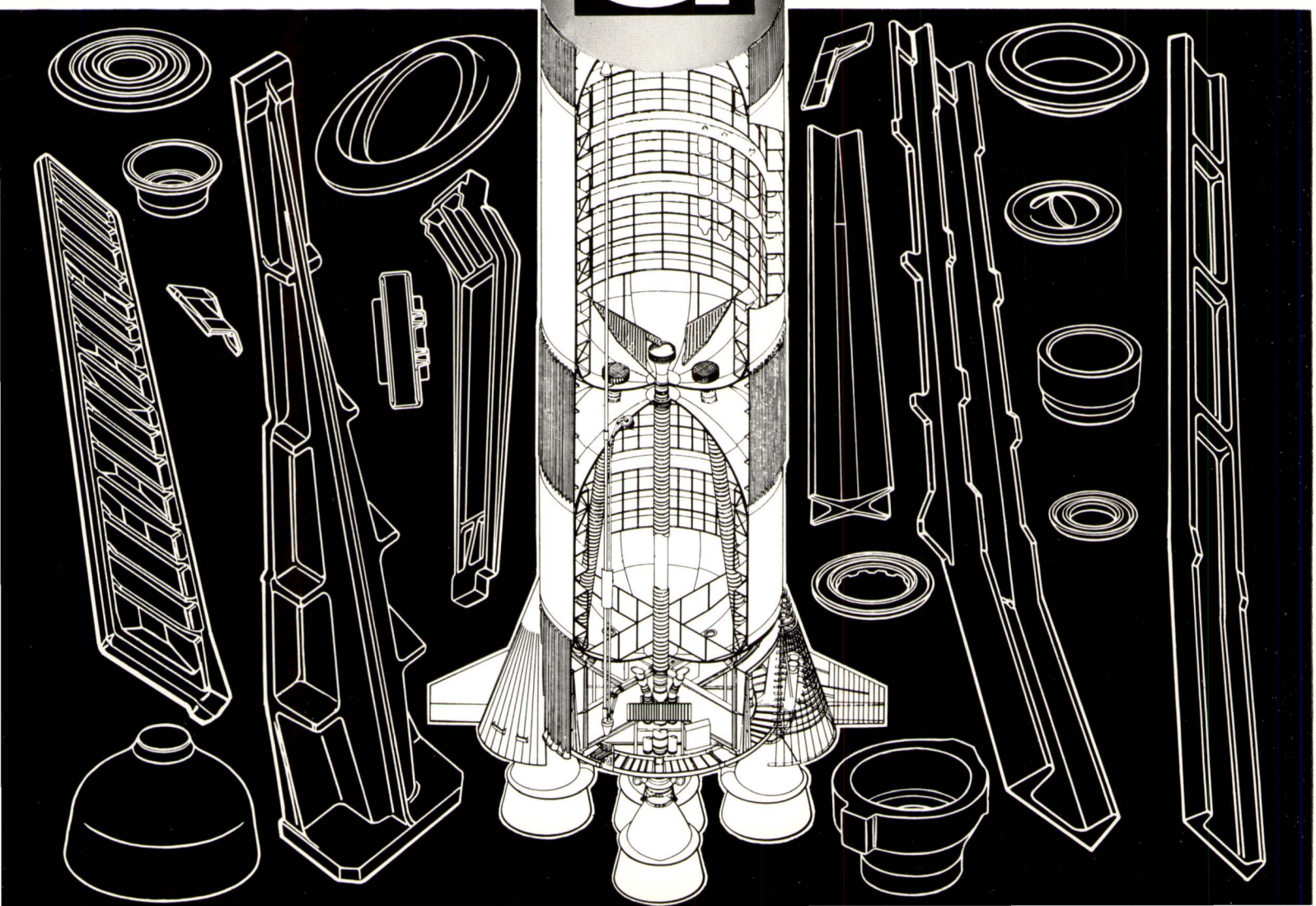

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Our Cover: Do you remember any of the formulas on the cover? Certainly Ohm's Law! How about some of the others? They represent Physics, Mathematics, and Chemistry, the science programs at Tech.

This issue of The Journal is devoted to the sciences at Tech—from A to Z. A great deal has occurred in these areas in the past few years and this comprehensive review is intended to bring you up to date on these developments.

The JOURNAL

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WARREN B. ZEPP, '42
Editor and Business Manager

ROY A. SEABERG, JR., '56
Assistant Editor and Business Manager

NANCY L. MONTAQUILA
Magazine Secretary

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IN THIS ISSUE

SCIENCE AT W. P. I.

by Richard F. Morton,

Professor of Physics and Associate Dean of the Faculty

As Worcester Tech heads into its second century, it finds itself in an atmosphere of science and technology which would be almost totally unrecognized by its founders. Sources of power which are now commonplace were beyond the wildest dreams of those days. As recently as a third of a century ago the neutron was just being discovered, no one seriously thought of harnessing atomic and nuclear energy, and electronics was just beginning to come of age. At that time industry hired many engineers but very few scientists, and only a handful of mathematicians.

World War II made abundantly clear the importance of research and development to our national security. The wartime experiences also brought into sharp focus the dangers of too narrow a specialization in engineering education. Much developmental work, in the field of radar for example, which normally would be considered engineering, fell to physicists at least in part because their education gave them sufficient breadth of knowledge to see the problems from an over-all point of view.

As a result, post-war engineering education has become increasingly science oriented. More and more engineering educators are becoming convinced that it is difficult, if not impossible, to provide both a broad background of science and professional training in engineering within the span of four academic years. The number of engineering students taking a fifth year of training is steadily increasing. Rensselaer has recently removed all professional engineering subjects from the undergraduate curriculum. Its course of study for engineers consists of a broad science-based undergraduate program followed by professional courses at the graduate level. W.P.I. has chosen the more usual practice of teaching the science and professional courses more or less in parallel, arriving at about the same end product after a year of graduate study.

The Congress of the United States, recognizing the necessity of our maintaining leadership in education in the sciences as well as in research and development, took steps to assure this outcome by establishing in

"The foundation of all modern technology"

1950 the National Science Foundation as an independent agency of the federal government.

Contrary to popular opinion the support of basic research, graduate fellowships, institutes for upgrading and updating college and secondary school teachers, and study of secondary school mathematics and science curricula were well under way before the appearance of Sputnik I. However, the Russian satellites had the immediate effect of loosening the Congressional purse strings and accelerating our national scientific efforts.

The initial efforts of NSF were directed toward the support of graduate study and research and the improvement of undergraduate science teaching. It soon became apparent that if the colleges were to do a better job of teaching the sciences, they must get better raw material and that the way to get this was to improve the teaching at the secondary school level.

The institute program for secondary school science teachers has had very beneficial effects and has grown to be one of the largest programs of the Foundation. The new secondary school curricula in mathematics, physics, chemistry, and biology have contributed much to the improvement of science at that level. Perhaps the most important part of this development was not the particular courses of study which evolved, but rather the fact that for the first time in many years a large number of competent scientists were taking a real and much needed interest in the teaching of science. The influence of these various study groups will be felt for years to come, and the end result cannot help but be beneficial regardless of the value of any individual curriculum developed.

The direct support for students by federal funds has been mainly at the graduate level and has increased to such an extent that any really good student of science is almost assured of having his graduate study financed by means of a fellowship or assistantship.

The production of advanced degrees has increased greatly as a result of the support of research and graduate study, but many believe that we are still falling short of national requirements. If this is so and the demands of national security are really not being met, then the next step must be to encourage more High-Ability students to elect science. However, this should not be at the expense of engineering, which is just as vital to our needs. It might be worth noting here that a great deal of confusion exists in the minds of the general public as to the distinction between science and engineering. Science or scientists make the headlines almost every day. We hear of the achievements of science in space, in medicine, and even in the development of automobile safety. Of course, the educational and industrial world realizes that much of the credit belongs to the engineers. It is not the scientist alone, nor the engineer alone, but rather the scientist and the engineer, working as a team, who are responsible for today's technological progress.

The Growth of Science at Tech

At W.P.I. science and engineering have always gone, if not hand in hand, at least side by side. The combination of theory and practice has always been an outstanding feature of the educational program.

Whether by coincidence or as a direct result, Tech's major advance in the area of science facilities occurred during the same period as the nation's advance; the years immediately after the launching of Sputnik I. In 1957 the college received the first of two large grants from the Olin Foundation. As a result the Olin Hall of Physics was opened in 1959 with a considerable amount of new equipment including a two-million volt Van de Graaff accelerator. This equipment, in addition to proving useful as an aid in instruction, also provided

" . . . it seems clear that the percentage of students majoring in science and mathematics will increase"

impetus for research by graduate students and faculty. In 1958, the Mathematics Department, which had always been purely a service department, was authorized to award the B.S. degree. And most recently, the Institute received the second Olin grant for a building to house the Chemical Engineering and Chemistry Department. This building will be ready for occupancy in the fall of 1965.

Perhaps the greatest growth of science at W.P.I. during this period was in the area of graduate studies. A necessity today for any college of engineering and science which wishes to maintain a position of leadership, the graduate program developed slowly but steadily. Concurrent with this growth has been an expansion of research in all departments. As would be expected, much of the research in science was basic in nature.

The Present Status of Science at Tech

On the following pages will be found more detailed articles on each of the science departments at Tech.

The following table compares their present enrollments with those of 10 years ago and with engineering enrollments.

	Chem.	*Phys.*	*Math.*	*Eng'g.*
Graduate Students 1954–55	1	0	0	28
Graduate Students 1964–65	13	16	0	105
Upperclassmen 1954–55	11	18	0	465
Upperclassmen 1964–65	33	43	41	741

The percent increase in the science enrollment has been quite large, particularly at the graduate level. This is due more to the fact that the base was small than that the increase is large. The figures on the engineering enrollment are included lest anyone fear that W.P.I. is about to be overrun by scientists. When absolute increases are considered, the gain in engineering enrollment has been about three times that in science, both at the graduate and undergraduate levels. The upperclass undergraduate science enrollment, including mathematics, is still only about 14 percent of the total enrollment in those classes.

Tech has much to offer the potential science student. While the majority of bachelor's degrees in science are awarded by liberal arts colleges or universities, a technical school such as W.P.I. can offer a considerably stronger program in science. Tech undergraduates get more mathematics, the subject matter is treated in more depth, and in general a greater technical proficiency is attained. The availability of many applied science courses in the engineering departments helps to make this treatment in depth possible. Of course, the increased depth of concentration in science means that a student will not devote as much time to other liberal arts subjects as in a non-technical school. A student should be sure before entering a school such as W.P.I. that this is really what he wants. The choice between science and engineering, and then between particular departments, are only refinements of the main decision which must be made prior to matriculation.

Science in the Years Ahead

Undoubtedly, the growth of science at Tech in recent years will continue into the future because science provides the foundation for all modern technology. When other factors are considered, such as governmental encouragement of science and increased effectiveness of secondary school science and math courses, it seems clear that the percentage of students majoring in science and mathematics will increase.

The life sciences, missing from the curricula up to now, are working in via the biomedical engineering curriculum, a cooperative graduate program with Clark University. Should this meet with its anticipated success, it would not be surprising to see the addition of a life science department on the Tech campus.

The case is clear for graduate study in science in its own right and in addition the availability of graduate courses in science is necessary for the support of graduate work in engineering as well as for providing highly competent faculty for undergraduate instruction. Graduate work in mathematics must also come in the near future, again not only for its own sake, but for the support of science and engineering.

W.P.I. has developed the capability for teaching high level graduate courses and finds support for students in the form of fellowships becoming more readily available. We are increasing our capabilities for research in science and need only to find sufficient funds for support of research to provide a really excellent graduate program in science. This need for additional support of research is also a major problem in our graduate program in engineering. If W.P.I. is to continue to provide the excellent undergraduate programs on which it has built its reputation, this problem must and will be solved.

At the national level there has been some discussion as to the wisdom of spending federal funds for basic research, which is really the seeking of knowledge without regard to useful applications. Some Congressmen and many others have felt that we should be able to see immediate benefits from the spending of public funds. In fact, there are those who feel that no research is worth supporting unless it produces practically useful results. To most in the field of science this seems to be an untenable point of view. Even if it were to be accepted that knowledge of itself has no value, who is to tell in advance what knowledge will prove to be useful? Fortunately the exponents of basic research have been vigorous in putting their case before Congress and increasing federal support seems assured.

Not every problem has an easy answer. At right, John T. Apostolos and Prof. Donald W. Howe, Jr. of the Physics Department discuss data from a "misbehaving" experiment. A close student-faculty relationship is a tradition at Tech.

PHYSICS

by Dr. Allan E. Parker,
Head of the Department of Physics

While the study of physics has been part of the curriculum of the W.P.I. student for many years, the opportunity for students to major in physics goes back as far as 1937, when the General Science designation was discontinued. At that time, just a few short years before man's initial successes in unlocking the energy of the nucleus, very few students selected physics for their major. The number gradually increased and it should be noted that it also included those whose primary interest was mathematics as there was then no opportunity to major in that area. In 1958, a major in this field was established. Today, there is an average of about 15 students in each graduating class who have majored in physics. These students have been prepared for either graduate studies or industrial work. For the past several years, 80 percent have gone on to graduate school directly after receiving B.S. degrees. In the undergraduate course in physics great emphasis is placed not only upon physics but also upon a sound mathematical foundation. A course in mathematics is required in each of the eight semesters, and the seniors are strongly urged to take four electives from amongst the humanistic studies instead of the two required of all seniors. As far as the physics courses themselves are concerned, the undergraduate curriculum places emphasis on fundamentals, resulting, it is hoped, in the student upon graduation realizing the importance of both the theoretical and the experimental approach to a problem. While fundamentals are emphasized, this does not mean that the course is a stagnant one. For example, the three-credit course in modern physics of some years ago without any laboratory work has gradually expanded to eight credits in two courses, one on atomic physics and the other on nuclear physics with considerable associated laboratory work and incorporation of a basic knowledge of quantum mechanics. Lasers and other solid state devices are considered and with the launching of the satellites, a check has

been provided on the formerly theoretical consideration of satellite orbits in the dynamics course. All seniors who major in physics undertake a small research project in which they learn something about literature search, the planning of an attack upon a problem and the execution of the solution. These are on a wide variety of topics. A few of those studied by the seniors who were graduated last June were: Measurement of the $I^{127}(n,n'\gamma)I^{127}$ Process, Test of a Theory of Electrically Driven Tornadoes, Biophysical Aspects of the Sternarchus Albifrons, Computer Optimized Negative Feedback Amplifier. A considerable amount of work on these topics is initially carried out in the library where today we find more than 60 of the leading journals of physics, as well as a wide selection of texts.

With the increasing enrollment at the Institute during the past two decades and the expansion of course offerings in the Physics Department, it has been necessary to add to the staff. At one time there were six staff members, while today there are 15. In planning this growth, additions were made so that there were individuals well qualified in each of the basic fields of physics. Once this had been accomplished, the decision was made to build up a high degree of competence in two areas. The areas chosen were low energy nuclear physics and solid state physics. Today we have several faculty members competent in each of these.

A program of graduate studies was initiated approximately 10 years ago, and the first recipients of the Master of Science degree in 1957 were Mr. and Mrs. Alan Carlan, who were sponsored by the American Optical Company. Since then our graduate program has grown to the extent that we presently average approximately five master's degree recipients in each academic year. Furthermore, continued expansion of the program has led to the award of the degree of Doctor of Philosophy this past June. We anticipate that the graduate program will continue to expand with increasing numbers of graduate students in both the master's and doctoral programs.

With the completion of the Olin Hall of Physics in 1959, not only was additional floor space available for research, but thanks to the generosity of the Olin Foundation, funds were made available which permitted the school to acquire a Van de Graaff accelerator and much associated electronic equipment, a large electro-magnet suitable for magnetic resonance research, X-Ray diffraction equipment, and a wide variety of apparatus needed for both undergraduate teaching and for research. The equipping of an excellent machine shop as a result of the funds supplied by the Olin Foundation should not be omitted, as it is essential to the maintenance of apparatus and the construction of equipment designed by those doing research for their specific problems. Not to be overlooked is the excellent support provided by the administration in the initiation of lines of research endeavors.

The lowest floor of the laboratory is the center of research efforts. At the south end of the building is found the group of graduate students and during the spring semester, undergraduates as well, working with Dr. Goloskie and Dr. Wooten in projects associated with the Van de Graaff accelerator. One of the current activities of this group is the investigation of excited levels of $Helium^4$. This is a problem which is currently being investigated in several laboratories of this country as well as in France, each laboratory using a different nuclear reaction in their research. At the other end of the floor the work in solid state physics is concentrated. Here the graduate students are working with either Dr. Weiss or Dr. Garth on a variety of problems such as the microwave behavior of ferrites or magnetic resonance studies. Laser investigations really extend in some degree from one end of the building to the other with two undergraduate projects as well as two graduate research programs involved. The doctorate awarded last June was to Wayne H. Keene for a study of The Time Resolved Spectrum of a Neodymium Glass Laser. The activity in the areas of study of signals emitted by electric fish under the direction of Professors Granath and Howe is also of interest to all.

During the summer months while the undergraduate students, for the most part, are away from the campus, the research activities in the Physics Department are still going ahead, and in fact, due to the presence of an Undergraduate Research Participation Program sponsored by the National Science Foundation, there is an energetic group of young men devoting their summers to learning the frustrations and joys of research. It has been the practice to invite a few students from other New England schools to participate in this effort. During the past few years there have been undergraduates from Bates College, Bowdoin College, the University of Maine, the University of Vermont, Middlebury College, Williams College, Amherst College, the University of Connecticut, and the University of Rhode Island. Last year there were 12 undergraduates carrying out research under this sponsorship in topics such as the following: Modeling in Oceanography, Light and Noise Emission from p–n Junctions During Avalanches, Interferometric Spectroscopy in the Infra Red Using a Michelson Interferometer, Energy Spectrum of $T(d, n)He^4$ by Pulse Height Analysis and Time of Flight Methods, Inelastic Scattering of Neutrons from Li^7.

In addition to these summer activities, there are also the research efforts being carried on by the faculty members and graduate students.

MATHEMATICS

by Dr. Elliott L. Buell,
Head of the Department of Mathematics

Freshman Dwight G. Shepard receives some help from Prof. Richard N. Cobb, John E. Sinclair Professor of Mathematics.

The understanding and mastery of basic mathematical skills has been required of all students throughout the history of the Institute. That statement can hardly be called news to any Tech alumnus, or, more generally, to anyone educated as an engineer or scientist. Such is the almost universal recognition of mathematics as the handmaiden of both the pure and applied sciences. For some she is also the queen.

Service Courses

The passage of a century has brought many changes, reflecting both the accelerating demands from disciplines which utilize mathematics and the very rapid advances in the subject itself. Instead of devoting much of his college mathematics time to the study of elementary algebra, geometry, and trigonometry, today's student must have studied these subjects in secondary school as entrance requirements, in order to delve at once into analytic geometry and calculus. Most freshmen now arrive with some knowledge of the former, and each year more of them have had at least a taste of the latter in secondary school.

To meet the challenge of the greater variation in students' preparation, resulting from the current revolution in mathematical education at the pre-college levels, all courses now exhibit more flexibility than was previously considered necessary. Even the "standard" two-year sequence through ordinary differential equations, which most students take, allows some choice of topics and their treatment beyond a common core. In addition, for several years experimental "honors" sections and "advanced placement" have been available as avenues of more thorough or rapid progress for the fortunate minority of students whose ability, motivation, and preparation are exceptionally good.

Another notable trend results directly from the accelerated pace of creation and application of new knowledge, already mentioned. Since it no longer seems possible to predict with much assurance the specific set of mathematical tools which an engineer or scientist will need in the course of his professional career (indeed, some of them may not yet have been invented!), the choice of topics and methods appears in a new light. While the selection is always strongly conditioned by the needs of other courses, the student must come to understand the material at a deeper level than merely manipulative technique. Otherwise, he is unlikely to be able to select and apply an appropriate method in varying situations or to learn or develop new mathematical procedures on his own as needed later. Although there is no easy solution to this problem of raising the students' level of mathematical maturity, it does imply that more attention must be given to the theory underlying the methods. This trend is evident in most present-day textbooks and syllabi. Here there is no intention of making mathematicians out of everyone, but rather to develop an appreciation of the nature of mathematics and the way in which mathematicians attack problem situations. To be

meaningful to most students, concrete examples are of course very necessary for motivation and illustration, and manipulative skills must be developed and sharpened. Thus, it is little wonder that there is no complete agreement on the optimum balance of emphasis to be accorded the theory, methods, drill, and applications. However, as the interesting but apparently eternal struggle to achieve such an optimum continues, one hopes and expects to reach closer approximations.

The demands from other disciplines and the developments in mathematics itself require continual reexamination of the offerings in existing service courses, dropping some and creating others. Examples of new areas added within the past few years include linear algebra, probability theory, digital computing, and numerical analysis. Since the elements of such subjects should be understood by all students, there is a continuing effort to find room for them in the standard sequence, as well as to treat them more thoroughly in separate advanced courses.

B.S. Degree Program

During almost all of the first century, the chief responsibility of the mathematics department was to provide service courses for the rest of the college. This function continues to be vitally important, but of equal significance now is the recently established undergraduate mathematics major. Far from conflicting, these two functions complement and reinforce each other most effectively. In fact, a number of the courses serve both students specializing in other disciplines and those in mathematics itself.

The motivation for a degree program in mathematics arose from a combination of student interest, faculty initiative and administrative encouragement. No doubt, it came partly as a response to the resurgence of emphasis on mathematics which has been so noticeable throughout the country in recent years. The approval of the program in 1958 was preceded by much discussion and careful planning, including a study of similar activities in many other institutions. It became effective in 1959 with the Class of 1962, who were then sophomores.

Although changes are still being made and will doubtless continue to be necessary, the essence of the program remains invariant. It is solidly based on a required core of study in modern algebra, analysis (advanced calculus and complex variables) and higher geometry. A sizable portion of the program is devoted to required work in other sciences and the humanities. In addition, the flexibility afforded by a relatively large number of electives permits the student to achieve a minor concentration in some field of science or engineering as well as a deeper knowledge of mathematics itself and a broader education in the liberal arts. In this way the student may prepare himself for graduate study in pure or applied mathematics or some related technical field, or for immediate employment in business, industry, government service or in private-school teaching.

To accomplish the mathematical portion of these objectives, it has naturally been necessary to expand the department's course offerings, in line with recommendations of the professional societies as well as our local needs. Besides the core subjects mentioned above, courses have recently been added in topology, advanced complex variable theory, and "topics," under whose "umbrella" such aspects of mathematics as the theory of numbers, logic, geometric algebra, and advanced statistics have been taught. Currently, an experimental course in actuarial science is being offered, with the encouragement and cooperation of the State Mutual Life Assurance Company, which has even provided one of its own actuaries to serve as the instructor. Further broadening of the spectrum of course offerings is made possible by the cooperative plan between Clark University and W.P.I.

Another notable improvement has taken place in the library holdings in mathematics. A few years ago they consisted of two current journals and only a handful of up-to-date books. Thanks to the vigorous efforts of a department committee, supported by much larger budgets and generous grants from the Lufkin Fund, the library now has a fine and much used collection of modern volumes and is subscribing to 36 mathematical journals. New acquisitions are being steadily received at a reasonable rate. These vital "tools of the trade" are housed mostly in the Central Library, in which the recently improved facilities and services will be even more enhanced when the Institute's George C. Gordon Library becomes a reality.

Student interest has been greatly increased, as evidenced in part by the formation of an active Mathematics Club, which is known by the colorful but nevertheless technically significant name of Semi-Simple Group. Several students have also become members of the Mathematical Association of America and have attended professional meetings by themselves or with members of the faculty.

Three classes have so far graduated from this new program, totaling 35 students. Some, of course, are now in military service, and several are employed by companies as diverse as aircraft and insurance. Most are pursuing advanced studies on either a full or part-time basis. Of these, several have continued in pure or applied mathematics, but others are in fields as varied as business, economics, operations analysis, engineering, actuarial science and even theology. Here is ample evidence of the breadth of modern applications of mathematics.

Sometimes the question is raised why a good student should come to Tech to study mathematics as his major interest when this subject has more traditionally been found in liberal arts colleges and universities. One general answer is simply to point out that most engineering and scientific schools do offer degree programs in mathematics. Like these sister institutions, Tech can provide a strong and thorough education to the student who is seriously motivated to study mathematics in conjunction with physics, chemistry, or some branch of engineering. If he wishes to minor in some field for which a major is not offered here (and there are many), he will be well advised to apply elsewhere. However, Tech students need not necessarily become applied mathematicians since the offerings in pure mathematics are quite adequate as preparation for graduate study along such lines.

Faculty

Substantial increases in staff have necessarily resulted from the growth of the general student body as well as the introduction of a mathematics major program. Thus the department has more than doubled over the past eight years. Its present roster of 15 full-time faculty members includes four who hold the Ph.D. and several others who are actively studying for advanced degrees in mathematics at other institutions, mostly Clark University. All must invest considerable time and energy in keeping up with the very fast pace of technical and pedagogical developments in the subject and related fields. Such growth is encouraged and assistance provided where possible.

An informal colloquium has been established, with speakers from both inside and outside Tech. There have been visiting lecturers each year, often in cooperation with the mathematics departments of Clark University and Holy Cross College and with NSF support. As part of the Centennial celebration, a special series of weekly colloquium lectures was delivered by Prof. Lynn H. Loomis of Harvard University on "Convex Sets in Analysis." They attracted participants from several neighboring institutions as well as from this campus.

Last fall the Institute served as host to the regular meeting of the Northeastern Section of the Mathematical Association of America. This gathering, held during Thanksgiving vacation, brought 150 mathematicians to the campus and was another significant event of the Centennial Year.

Professional activities of the staff are increasing. In some cases faculty members have served as officers of national societies and consultants to industry or scientific organizations. Participation in special summer programs, such as NSF institutes, either as instructors or as students, is also growing. Some staff members have been performing notable community services, especially assisting local public school systems with special projects. Several faculty members are also regularly involved with teaching in Tech's summer school and evening graduate program.

The Future

Although extrapolation is risky, it is also fun, so a few projections will hopefully be pardoned.

In the area of formal offerings, there will surely be further extensions and improvements in both service and mathematics major courses. For example, a new course in methods of operations research will be started next year as a required feature of the Institute's new B.S. degree in Management Engineering.

In line with national trends, all students and especially our own majors, will be expected to study their subjects at greater depth and more independently. This is one of many results likely to become prominent as the dramatic changes now taking place in secondary school mathematics exert their full impact at the college level. Some additional experimentation with educational methods may also be desirable, in an effort to optimize the learning process.

Recognizing the national need and desirability of graduate study for most professional mathematicians and the demand for more advanced mathematics in other graduate disciplines at W.P.I., the department has been considering a graduate program at the M.S. level for some time. These efforts have now culminated in a formal proposal which has been presented to the Institute. If approved, this new and very significant venture will get under way as soon as the necessary funds can be obtained. Although there is no present plan to extend it to the Ph.D. level, such a development is conceivable at some future date if the requisite support and strength can be obtained and if the need is clear.

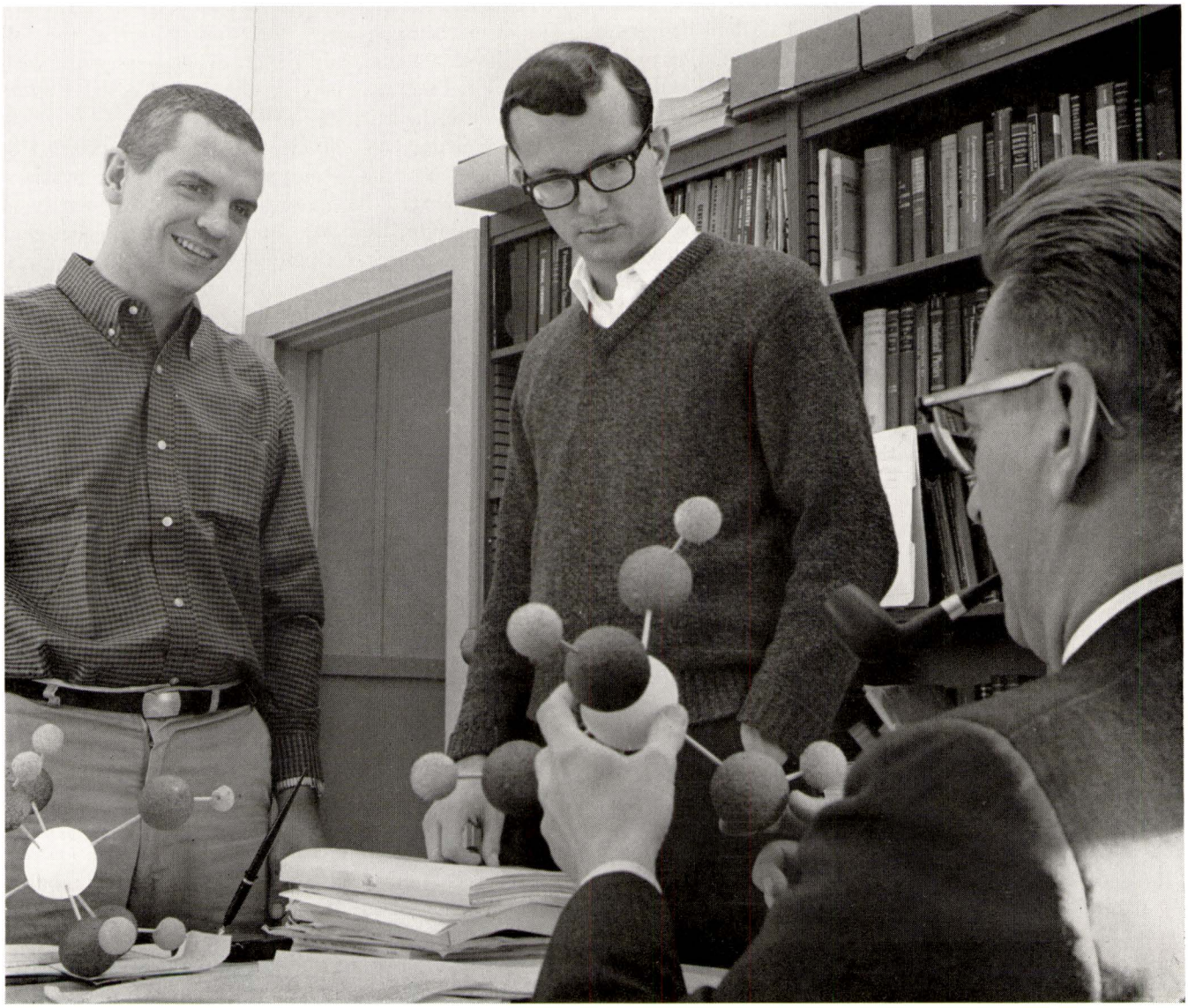
The predicted growth of the Institute and the proposed M.S. program will require some additional strengthening of the faculty in specialties not now adequately represented. Research and publication activities must be encouraged to a degree consistent with the Institute's policies and objectives. Also implied are the further expansion of library holdings and much needed extensions of staff services and improved facilities. As one result of the major development effort now in progress at Tech, we anticipate a renovated building with more adequate offices, classrooms, seminar and common rooms, service rooms, and expansion of the presently overcrowded Computation Facility (which is administered through the department but is in reality an Institute-wide facility).

With these developments in view, the future promises to be interesting and certainly busy for faculty and students alike.

INDEPENDENT STUDY

by Dr. Robert C. Plumb,
Head of the Division of Chemistry

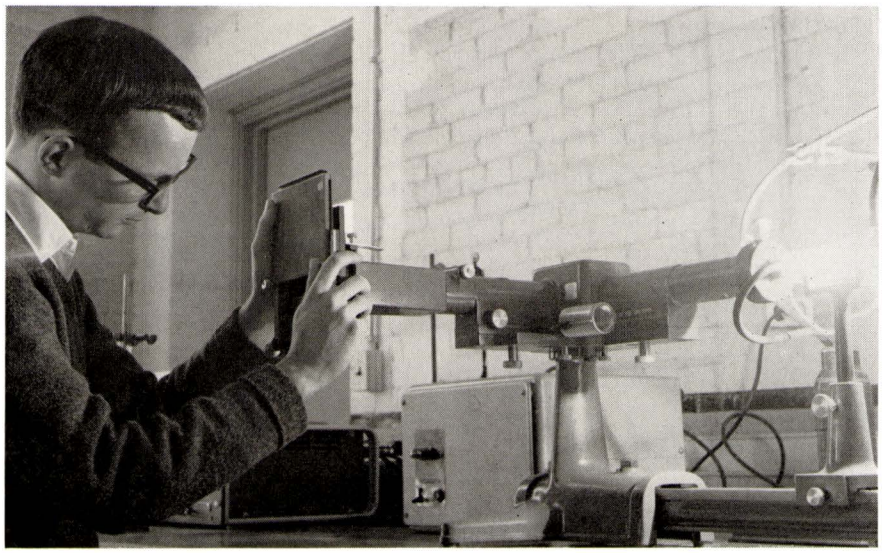
The inception of an idea. James W. Swaine, Jr. (*left*) and Victor A. Maroni (*center*) discuss the two conflicting theories of the structure of the aluminate ion with Dr. Robert C. Plumb. Dr. Plumb is holding a ball and stick model of one of the two possible structures.



Scientific creativity, requiring both a scholarly mastery of the fundamentals of science and a generous dab of imagination and skepticism, is the attribute which most often distinguishes the outstanding scientist from his colleagues. Although some may argue that creativity cannot be taught, most concede that creativity can be enhanced by placing a student in an environment where creativity is the norm rather than the exception, and providing him with sound instructors who themselves clearly understand the scientific concepts they teach. The importance of sound instruction must be emphasized because of the tremendous waste of effort which results when a student attempts creative work but is not able to distinguish between (1) the known facts and theories of science, (2) the true frontiers of scientific research, and (3) his own vagueness in understanding of scientific principles.

After three years of undergraduate training, the average W.P.I. science student is ready to exercise his creative talents. A faculty adviser guides the student into a problem which is sufficiently well defined and stimulates his thinking and provides a critical review at each stage in his work, but the principal responsibility to produce is in the hands of the student.

As one would anticipate, some projects are more successful than others. A typical story of a successful project is shown in the accompanying pictures and text describing the undergraduate research performed by Victor A. Maroni, who received his B.S. degree in chemistry with high distinction at W.P.I. in 1964. Maroni, now a graduate student working for the Ph.D. degree in chemistry at Princeton University, collaborated with James W. Swaine, Jr., B.S. in chemistry with distinction in 1961, in this project.



Maroni begins gathering data. Above he is shown operating a Raman spectrometer. He obtained additional data on a more advanced instrument at Harvard University.

The Structure of the Aluminate Ion as Determined by Raman Spectral Measurements

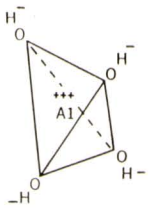


Fig. 1a

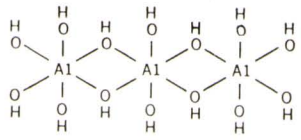


Fig. 1b

Pictured in Fig. 1a is the previously accepted representation of the structure of the aluminate ion. Fig. 1b shows the structure now accepted on the basis of Maroni's work.

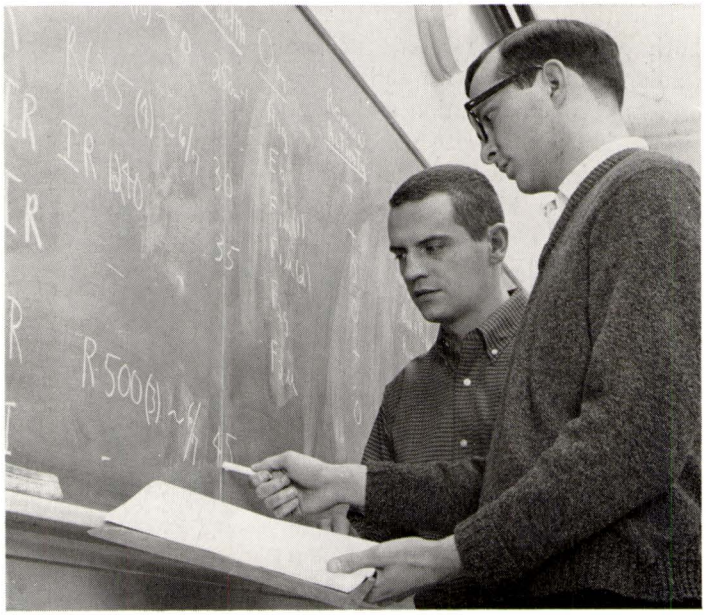
It has been generally thought that the aluminum ion in alkaline solutions is surrounded by a tetrahedral arrangement of four oxygen ions, as in Figure 1a. Each oxygen would have a hydrogen attached to it and the chemical composition of the complex ion would be $Al(OH)_4^-$. This structure has been widely accepted by scientists and is based upon previously published studies which, when examined closely, are not very conclusive. Work done by James W. Swaine, Jr. under the direction of Prof. Robert C. Plumb, using reversible electrode potential measurements, has shown that it is more likely that the complex ion is built up in long chains like a polymer with each aluminum ion surrounded by six oxygen ions, as in Figure 1b.

Victor A. Maroni undertook to test the two conflicting theories as to the structure of the aluminate ion by measuring the vibrations of the aluminate ion with a Raman spectrometer.

Maroni showed that the aluminate vibrates in a manner which one would expect if the aluminum were surrounded by six oxygen ions rather than in the manner one would expect if it were surrounded by four oxygen ions.

Maroni's conclusions are of considerable scientific import and are being published in a scientific journal.

The data gathered, Maroni begins the long job of analysis. Pictured at right, he discusses the results with Swaine. On the blackboard are symmetry correlation tables. Maroni's conclusions resulted in a scientific paper of definite importance. His big moment came when he presented his findings, shown below. As a sequel, Maroni is continuing his investigations in this field at Princeton University, where he is studying for his doctorate.

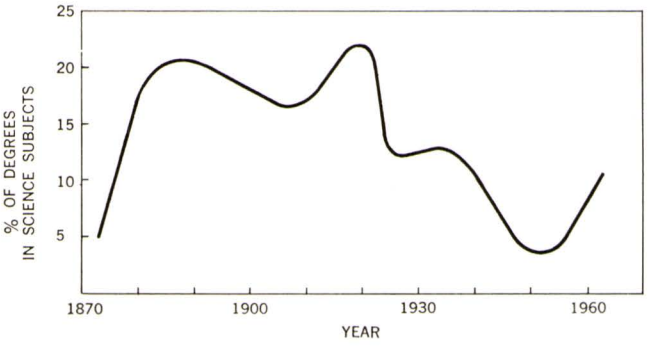


CHEMISTRY

by Dr. Robert C. Plumb,
Head of the Division of Chemistry

Worcester Polytechnic Institute has witnessed in its 100-year history the remarkable evolution of science. W.P.I. itself has at times been acutely involved in the growth of science; and at other times, when the school was more strongly oriented towards practical, less academic subject matter, science has tended to be in a service role to the engineering fields. The graph on this page, showing how the distribution of degrees awarded in science and engineering has varied over the years of our history, illustrates the shifts in emphasis on science at W.P.I. The story of chemistry at this Institute goes back to Dr. Charles O. Thompson, professor of chemistry and first principal of the Institute. Under Dr. Thompson's direction students were trained in the analysis of important industrial materials, food products, and beverages—including beer. Sanitation chemistry was the main field of interest of Dr. Leonard P. Kinnicutt, Dr. Thompson's successor in charge of instruction in chemistry. Deadly outbreaks of disease, transmitted through drinking water and controlled by proper water treatment, were of great concern in Dr. Kinnicutt's time and made his work especially important, bringing recognition to both W.P.I. and Dr. Kinnicutt.

Such was the nature of the science of chemistry in the early days. Since then, science has changed a great deal, but nevertheless the activities of that era provided the foundation of present-day science. Among the later contributors to the growth of chemistry was an able organic chemist, Dr. Walter Jennings, head of the Chemistry Department after Dr. Kinnicutt's death. Another, Dr. Farrington Daniels, a staff member from 1914–18, was starting on a career which would lead him to international renown as one of this country's foremost physical chemists. During these years, Worcester Tech had a fairly well-balanced interest in science and engineering, and a very substantial portion



of the student body received degrees in scientific fields. Science (mostly chemistry but with a few degrees in physics and general science) accounted for 17 or 18 percent of the degrees awarded, hitting a peak of 27 percent in one year.

From about 1920–50, the "engineering school image" of Worcester Polytechnic Institute developed and interest in the sciences waned. In the years around 1950, science enrollment at the Institute reached an all-time low of less than five percent. During these years, the science of chemistry made tremendous strides, although interest in chemistry and science at the Institute sometimes lagged. Now, as part of its 10-year plan, W.P.I. is embarked on a course designed to restore science to its position of importance.

Modern-day chemistry has evolved as a curious blend of experimental empiricism and fundamental theory. This sometimes results in chemistry being indistinguishable from the most theoretical of physics, and at other times causes a chemist to appear as an opportunist, seeking—by trial and error and systematic, patient study—answers to the most elusive of Nature's secrets. Although chemistry as a science is

more concerned with research and advancing the frontiers of human knowledge, it is also widely recognized that training in chemistry provides one of the best foundations for a later career in applied work.

W.P.I.'s chemistry curriculum has recently been going through a tremendously active period of re-examination and change. New courses in instrumental analysis, the theory of atomic and molecular structure and bonding, solid-state chemistry, and inorganic chemistry have been added. Traditional subject matter such as organic chemistry has been recouched in a more theoretical framework. Some subjects such as sanitation chemistry and traditional analytical chemistry have had to be removed or reduced to make room for the new. Independent study is important in the chemistry curriculum, as described in another article in this issue of The Journal. With expanding subject matter has come a change in the philosophy of educating chemists. For many jobs, a chemist cannot be trained completely in a four-year program, and a goodly number of students—especially those planning careers in research—will go on to graduate school. Thus, Tech's B.S. program in chemistry is no longer primarily a terminal course.

As a technical institution, Worcester Polytechnic Institute has been more successful in incorporating the wide range of subject matter of modern chemistry into the undergraduate curriculum than non-technical colleges which also offer degree programs in chemistry. One of the unique undergraduate chemistry courses at W.P.I. involves the determination of atomic and molecular structure by applying precise mathematical theory to modern instrumental experiments to determine the arrangements of atoms and molecules in chemical compounds and crystals. The instruments for this course have been obtained through a special undergraduate equipment grant from the NSF. These same instruments, and others obtained through department funds and research grants, are also used to provide students with a course in modern instrumental analysis. The strength of our program is demonstrated by the outstanding performances of our graduates. For example, two recent instances involved W.P.I. graduates entering one of the East Coast's most prestigious institutions for graduate work. Both of these men, in competition with B.S. chemistry graduates from other schools, passed all entrance qualifying examinations, and demonstrated thereby that they ranked in the upper 20 percent of the students with whom they were in competition.

The graduate program has been a major influence in stimulating the growth of the strong undergraduate chemistry program. The Chemistry Division first offered the M.S. degree before 1912, and has had an active Ph.D. degree program since 1958. For the undergraduate student, the main benefits of the graduate program are: (1) the rapid funneling of new ideas and new insights from the research frontier down to the undergraduate level. For example, some concepts of bonding which were only rarely introduced at the Ph.D. level at graduate institutions 10 years ago are now "old hat" at the sophomore or even the freshman level; (2) the attraction to the campus of high-quality faculty who would not come here if there were no graduate program; (3) the availability on campus of some of the most modern instruments for experimental chemistry; (4) the contact with the real arena of science—research and independent study, which is the professional activity of scientists. Students at Worcester Polytechnic Institute are brought into contact with this sphere of activity. Without this contact, an undergraduate student could earn his bachelor's degree without ever realizing what science is really all about.

The graduate program in chemistry has active research programs in physical chemistry of solid surfaces, mechanisms of organic reactions, study of unusual inorganic compounds, and study of the nature of ions in solution. During the past seven years, these research programs have been supported by outside funds totaling about $271,000 from the Atomic Energy Commission, the National Institutes of Health, the National Science Foundation, the American Cancer Society, the Research Corporation, and the Department of Health, Education, and Welfare. Of the three Ph.D. graduates up to 1964, two have received post-doctoral fellowships at other graduate institutions (Brown and Stanford). The research accomplished in the graduate and undergraduate programs has been made known to the scientific community through publications in highly respected international scientific journals, as well as in lectures at national and international scientific meetings. In the past seven years, staff members and students of the Chemistry Division have published 19 papers based upon work done at Worcester Polytechnic Institute, have spoken at five major scientific meetings in this country and abroad, and have presented numerous colloquia and seminars at other academic institutions. One staff member has served as tour speaker on a program arranged by the national American Chemical Society.

The Chemistry Division is in a process of vigorous growth. The renewed interest in science at Worcester Polytechnic Institute and the strengthening of the programs in allied scientific fields are apparent in the upturn in enrollment in the sciences which has taken place in the last decade. We look forward to an exciting future in which we will live up to the heritage of our predecessors by continuing to make graduate and undergraduate training at Worcester Polytechnic Institute the best available.

Centennial Fund Tops $10 Million

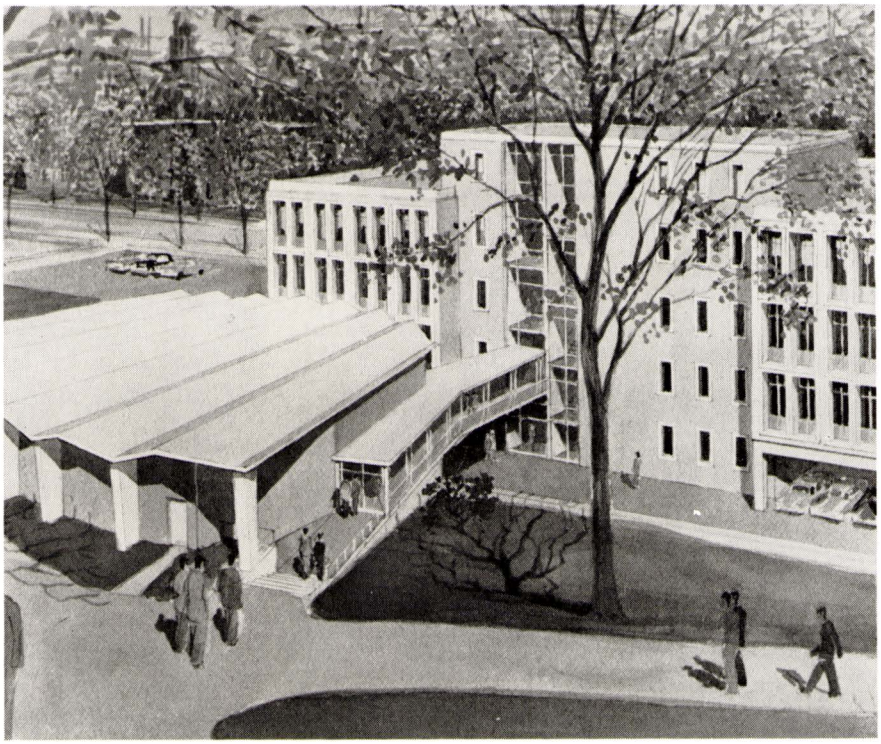
Since National Chairman Philip M. Morgan, on that evening early last autumn, revealed that Worcester Tech was about to embark on a $15 million capital gifts campaign, the Centennial Fund evolved from a sum slightly over $3 million to a year's end figure in excess of $10 million.

Several major gifts helped account for the total. Included were gifts from the Charles A. ('95) and Frank C. Harrington ('98) Foundations for $1.7 million, and a $5 million bequest from the estate of George C. Gordon, '95, the largest single amount received in the Institute's one hundred year history.

During the fall, alumni in the New England states organized to begin solicitation, and by the end of December, all chapters in this area were in full swing. In some areas, leadership committees were organized to call upon prospects able to subscribe larger amounts to the Centennial Fund.

In January, the first contacts were made to set up volunteer committees in New York, Northern New Jersey, Philadelphia, Wilmington, Baltimore, Washington, and Pittsburgh. By the end of May, plans call for solicitation to begin in the other alumni areas, especially those large cities of the midwest. As a rule of thumb, in all places having Tech residents of 25 or more, a person-to-person solicitation will be initiated. It is hoped that all alumni solicitation can be completed by this September.

The results so far have been very encouraging. The record books show that seven out of every 10 Tech men contacted are making pledges to the Centennial Fund. In the majority of cases, "shares" (gifts ranging from $300 to $10,000) have been pledged.



The proposed humanities building, with the theatre-lecture hall at left.

While the Centennial Fund has done well thus far, there is still a long way to go.

Some schools have sought to fill the gap in their development programs by appealing to the large, national philanthropic foundations for grants. While no source of money will be overlooked, and though foundations have in the past looked favorably upon Worcester Tech, we would be remiss if we placed undue emphasis on the uncertain security of possible grants. Statistics point out that the gross amount given by foundations to national philanthropic movements is about eight per cent, and only two per cent of this figure is earmarked for education. Therefore, Tech must continue to look to private sources for most of its aggregate support.

The Centennial Fund goal is a realistic one, but one that is a challenge. The Trustees knew this when they voted to undertake the program. It is a goal that can only be achieved with time, work, and financial support. Tech's needs are great.

The Institute is proud of the progress to date, but, as those in the football world say, "The last 20 yards are the most vital, and the hardest to make." The same is true of the Centennial Fund goal —the last several million is the hardest to raise, but as equally necessary as the first 10 million.

TWO TOWERS, Reviewed by

IVAN SANDROF, *Literary Editor,*
Worcester Telegram & Gazette

Worcester Polytechnic Institute reaches its first century with this landmark of a book, quite possibly the best book buy at the moment in the nation.

In 244 pages, with sources, index, quotations and approximately 300 illustrations, the folio-sized volume proceeds to relate as no other work before it, the story of W.P.I. or "Tech" as it is familiarly known.

This is no ordinary story. But then Tech is no ordinary institution. It is one of the basic heartbeats of Worcester, growing constantly in stature and importance in a scientifically oriented world and a mechanically minded community.

Mildred McClary Tymeson of West Boylston lavished two years of her life upon this work, interviewing 88 persons for their recollections and probing some 200 sources.

Let us face facts. The "hairy engineers" are traditionally important. But much that has gone on up on the hill where the complex of Tech has risen through the past 100 years—has been metronomically monotonous. Important yes, but tedious.

Inspired Research

This hasn't fazed the author. With the patience of an inspired researcher she plowed, sifted, weighed and pondered, omitting the chaff and searching for the bright bits, the important phases, the glitter of truth, the interesting parts. To do this and to preserve the balance of the whole is a difficult art. She has done it and done it well.

Future chroniclers, perhaps after Tech's bicentenary, will have cause to be more than grateful for her labor of devotion. And current readers will learn much that they never knew, and find themselves drawn into the author's pleasant narrative style, aided by an eminently readable type face.

John Boynton, wealthy retired Templeton tinware manufacturer, had reached 73 in 1864. Both time and money lay heavy on his hands, the author reveals. "He had become almost a recluse." In his thinking lay the thought of "a vague wish" for using his fortune for the promotion of the welfare and happiness of his fellow man, possibly through a school.

Apparently Boynton had "a pathetic lack of cultural training," Mrs. Tymeson reveals. His inventory at the time of death showed "a Bible, the New Testament and Psalms, a twelve-volume Evangelical Library, an encyclopedia valued at a dollar, and a three-volume report of a Manufacturer's Convention—no more."

David Whitcomb, a cousin, partner and business successor who retired to Worcester after 20 years, suggested Worcester as the logical location of a school. Boynton agreed—providing that Worcester would give land and buildings and that Boynton's part in it be kept quiet. It was for almost three years.

Began Quietly

That's how Tech began, quietly, modestly, incorporated as the Worcester County Free Institute of Industrial Science. It was also referred to as the Scientific School, the School of Industrial Science, the Technical School and Worcester Free Institute, Worcester Polytechnic Institute (1887), "The Tech," Tech and W.P.I.

By 1965, Tech's endowment reached a value of $17,500,000 and a yearly budget from $5,450 in its first year to $4,500,000 in 1965. It had risen from an obscure and wistful vision in a rural tinmaker's eye to one of the most respected technical institutions in the nation, known in fact throughout the world. It is the third oldest independent engineering college in the United States. Its firm purpose: to teach basic engineering and science to about 1,400, including about 150 graduate students. By 1970, according to President Harry P. Storke, Tech will be teaching 2,000.

"Today," concludes the author, "the Institute stands solidly atop its rounded hill, still overlooking the City and reaching toward the sky. It stands there for more than any other reason because—by some strange and wonderful supply—there have always been enough people who cared."

Completed Careers

Arthur William Beaman, '02

Arthur William Beaman, born July 6, 1876 at Winchendon, Massachusetts; died December 29, 1964 at Worcester, Massachusetts.

Beaman worked for a short time with the Shredded Wheat Company in Worcester. He then moved to Chicago, but returned to Worcester a short time later.

The following 24 years he served as treasurer of the Stockbridge Machine Company.

Beaman founded A. B. Manufacturing Company in 1927, which made knife grinders and grinders for sharpening saws. He directed it until retirement in 1957.

His sister, Miss Gertrude A. Beaman, died last October.

George Cyrus Bunker, '03

George Cyrus Bunker, born May 26, 1881 at Bethlehem, New Hampshire; died December 3, 1964 at Chapel Hill, North Carolina.

After graduation, Bunker did graduate work in sanitary engineering at M.I.T. His first position was with the American Water Works and Guarantee Company of Pittsburgh.

In 1914 he went to the Panama Canal Zone, employed by the Canal Zone government, and placed in charge of water supply. He formed his own consulting engineering company in Panama City in 1927 and was active on water projects throughout Latin America.

He moved to Caracas, Venezuela in 1936 and while there established a laboratory for the analysis of water and sewage.

When a revolution broke out in 1946 he returned to Panama City and became a consulting engineer with Harold T. Smith International. He was located in Panama City and Ecuador until his retirement in 1957.

Recently he has made his summer home in Chapel Hill. After he retired, he gave his extensive library on sanitation engineering to the University of North Carolina School of Public Health.

Frank LeRoy Eames, '03

Frank LeRoy Eames, born 1883 at Upton, Massachusetts; died January 9, 1965 at Clearwater, Florida.

A graduate of the Harvard Dental School in 1904, Dr. Eames was a practicing dentist for more than 50 years.

He was a member of the American and Massachusetts Dental Societies.

He leaves his wife, Mrs. Winona Eames; and two daughters, Mrs. Donald Hagerman and Mrs. Homer Gammon.

Stockbridge

David Field Stockbridge, '08

David Field Stockbridge, born July 7, 1884 at Northfield, Massachusetts; died January 6, 1965.

After working at various firms in the New England area, Stockbridge joined International Harvester Company in 1912.

He became chief engineer for the Capitol Steel & Iron Company of Lansing, Michigan in 1914, remaining until 1918.

Until 1923, when he returned to Capitol, he worked at another Lansing firm and in Pittsburgh. Upon his return to Capitol he became president and served as such until his retirement in 1949.

He was married in 1915 to Miss Maud Holley of Oklahoma City. Their daughter, Mary Ellen, was born in 1925 and passed away in 1958.

Pedro Maria Capdevila, '12

Pedro Maria Capdevila, born October 22, 1886 at Diamante, Entre Rios, Argentina; died September 13, 1963.

Capdevila was graduated with a degree in electrical engineering and spent the following two years in the Argentine Navy. In 1914 he joined the staff of the University of La Plata and in 1916 was elected to the faculty. During the period 1916–17 he was also director of the electrical laboratory of the City of Buenos Aires.

He was appointed rector (principal) of the Colegio Nacional "J.V. Gonzalez" of La Rioja, a secondary school, in 1937 and held this position until retirement in 1955.

Also active in government, he was a member of the City Council of the City of La Rioja from 1932–38 and served two terms on the Board of Education of the State of La Rioja, 1932–34 and 1936–38. From 1951–52 he was president of the State Highway Commission of La Rioja.

He leaves his wife, Mrs. Bernabela S. Capdevila; and two sons, Horacio and Pedro F. N. Capdevila.

Charles Edward Hazelton, '12

Charles Edward Hazelton, born September 20, 1887 at Montague City, Massachusetts; died January 18, 1965 at Worcester, Massachusetts.

Prior to entering Tech, Hazelton attended Williams College.

Upon graduation from W.P.I. he worked for Turners Falls Power & Electric Company from 1912–18. In 1919 he became associated with Russell Harrington Cutlery Company, retiring in 1945 as treasurer. Until recently he was in the purchasing department of Reed & Prince Manufacturing Company of Worcester.

Hazelton was a charter member of the Turners Falls Rotary Club and also served on the Montague City finance committee for many years.

He is survived by his widow, Mrs. Mary L. Hazelton; three sons, Charles L., Lester W. and David S. Hazelton; two daughters, Mrs. Mary Ann Crosbie and Mrs. Natalie Mata; a sister, Miss Helen W. Hazelton; 16 grandchildren and one great-grandchild.

Thomas Rice Herbest, Jr., '13

Thomas Rice Herbest, Jr., born August 20, 1890 at Lewiston, Maine; died December 27, 1964 at Philadelphia, Pennsylvania.

Herbest was with Consolidated Expanded Metal Companies for the early part of his career. He was appointed vice president and sales manager in 1925 and later president. In 1938 he started his own sales agency, T. R. Herbest & Associates, in Philadelphia.

During World War II he was with the War Production Board and later the Army

Corps of Engineers. He retired in 1960 and after a short period in his native state of Maine, returned to Philadelphia.

He leaves his wife, Mrs. Verna Herbest, and two daughters.

Carl Graydon Hockett, '13

Carl Graydon Hockett, born in 1890 at Sheridan, Iowa; died December 31, 1964 at Uxbridge, Massachusetts.

Hockett, who worked for the Fram Corporation of Providence, Rhode Island for 28 years, patented more than 15 inventions during his lifetime. He was chief production engineer prior to his retirement.

He leaves two stepchildren, Lt. Col. Burt S. Sanborn (Ret.), and Mrs. Ruth S. Emmott, and seven step-grandchildren.

A. Murray Duff, '21

A. Murray Duff, born May 17, 1899 at Boston, Massachusetts; died January 10, 1964 at West Newton, Massachusetts.

Since 1933, Duff has been with the Macallen Company of Boston, with the title of comptroller since 1935. Prior to this he worked as a public accountant in business for himself and before that was with Stewart, Watts & Ballong of Boston as an industrial accountant.

During World War II, he served as a captain in the Ninth Coast Artillery at Fort Banks, Winthrop, Massachusetts.

During the early 1930's, Duff served as president and vice president in the Boston Chapter of the Alumni Association.

He leaves his wife, Mrs. Charlotte F. Duff, and a daughter, Miss Alexandra Duff.

Laurence Nelson King, '28

Laurence Nelson King, born June 13, 1905 at Feeding Hills, Massachusetts; died December 16, 1964 at Westfield, Massachusetts.

Since he left W.P.I., King has been the co-owner with his brother of a boat building and marine supply firm on King Beach of the Congamond Lakes in Southwick, Massachusetts.

He leaves his wife, Mrs. Naida H. King; two sons, Robert N. and Arthur G. King; a daughter, Miss Laurie I. King; a brother, Harold A. King; and two grandchildren.

Everett Albert Gartrell, '31

Everett Albert Gartrell, born August 15, 1908 at Turners Falls, Massachusetts; died December 15, 1964 at Poughkeepsie, New York.

Following graduation, Gartrell worked at several jobs before entering George Washington University Law School. He received his LL.B. degree in 1940.

He was employed as a patent attorney by the International Business Machines Corporation, where he was considered an expert in electronic components development. Prior to joining I.B.M. he was with the Hazeltine Corporation for 16 years.

Besides his parents, Mr. and Mrs. Albert G. Gartrell, he leaves his wife, Mrs. Martha B. Gartrell; a son, Donald E. Gartrell; two daughters, the Misses Barbara A. and Beverly E. Gartrell; and a brother, Irving J. Gartrell, '33.

Maddock

Edward Robert Maddock, '32

Edward Robert Maddock, born June 16, 1908 at Saratoga Springs, New York; died April 19, 1964 at Decatur, Alabama.

Maddock worked for a short while with the New York Power and Light Company as a service man before joining Worthington Corporation as a test engineer in 1936. At the time of his death he had just been assigned to an important new position in Worthington's international operations. His most recent post had been special assistant to the division manager—manufacturing, at Worthington Air Conditioning Company.

He was married to Miss Naomi Piersall of Indiana in 1940. Their daughter, Stephanie Rae, was born in 1945.

Francis Mason Harris, '40

Francis Mason Harris, born December 7, 1917 at Worcester, Massachusetts; died December 29, 1964 at Worcester, Massachusetts.

After working for Leland-Gifford Company, Norton Company, and Rice Barton Company, all of Worcester, Harris moved to the West Coast in 1945, living in San Diego until his return to Worcester in 1955.

Besides his mother, Mrs. Millicent R. Harris, he leaves two daughters, Mrs. Margaret Sanberg and Mrs. Susan Gillespie, and two grandchildren.

The following alumni have also been reported as deceased:

Harold S. Bloch, '04, August 18, 1964.

Ralph C. Mead, '11, date unknown.

Frank B. Kelley, '12, September 19, 1964.

George L. Smith, '15, November 2, 1964.

John A. Burns, '24, June 27, 1964.

Warren S. Newton, Jr., '24, September 5, 1964.

Wilbert E. Stevenson, '25, March 6, 1963.

Alf T. Rode, '34, July 13, 1963.

Richard H. Dexter, '39, November 6, 1964.

James F. Dempsey, SIM '58, date unknown.

Your Class and Others

1906

We regret to report that Mrs. Sarah M. Smith, wife of *James E. Smith*, passed away on January 29, 1965 in Washington, D.C. Mrs. Smith graduated from the Washington College of Law and was a member of the District Bar. She leaves her husband; two daughters; a son, *J. Morrison Smith*, '37; eight grandchildren and four great-grandchildren.

1908

Frank E. Wood of Whitinsville, Massachusetts entered Worcester Memorial Hospital in November with pneumonia complications. His stay in the hospital has been cheered by the visits of his friends. . . In December *H. Clayton Kendall* tripped and suffered a back strain. He has been confined to his home somewhat and will be delighted to see his friends.

1910

Oliver B. Jacobs, who is retired from the Bell Telephone Labs, keeps busy with various community activities in Morristown, New Jersey.

1912

Mrs. Grace Poland, widow of *Edwin F. Poland* who died in 1944, passed away on October 10, 1964.

1914

Our sympathy goes to *Chester M. Inman* for the loss of his wife, Mrs. Fanny F. Inman, on November 20. She leaves her husband; her son, *Chester M. Inman, Jr.*, '52; three daughters, Mrs. Edith I. Swan, wife of *Frederick W. Swan, Jr.*, '35, Mrs. Nancy I. Kennedy, wife of *Owen W. Kennedy, Jr.*, '45, and Mrs. Elizabeth I. Kirkpatrick.

1916

Gordon C. Garland, now retired from Sparkler Manufacturing Company in New York City, has chosen Hyannis, Massachusetts as a retirement home.

1918

Roger M. Lovell is the retired manager of real estate for New England Power Service Company in Boston. Formerly of Worcester, he now lives in Gill, Massachusetts.

1919

Carl I. Benson now makes his home in Hancock, New Hampshire, following his retirement as vice president of Eastern Refractories Company, Inc. last October.

1920

After 17 years as regional engineer for the U.S. Forest Service's nine-state, eight-and-one-half-million-acre North Central Region, *Malcolm B. Arthur* retired on December 30. He was the recipient of a Superior Service Award from the U.S. Secretary of Agriculture two years ago, and was made a Fellow of the ASCE in 1959 and a life member in 1961.

1921

Ricardo G. Pereira has retired from active service with Companhia Fôrça e Luz de Minas Gerais. . . Dr. *Earl H. Winslow* had served as a General Electric Company research chemist at the Schenectady research lab until his retirement recently.

1922

In February, *Wilfred H. Howe* was presented a Fellow award certificate by the Boston Section of the IEEE. He was one of eight men in the Boston area to receive this distinction. He is chief engineer of the Foxboro Company.

1924

Listed as "address not known" for the past few years, *Russell S. Davenport* turns up in Lexington, Massachusetts, where he owns and operates Davenport's Garden Center & Flower Shop.

1925

Edward E. Franks, Jr. begins his first year of retirement in 1965, having served as sales manager of the Torrington Manufacturing Company's Machine Division in Chicago until December 31. He now lives in Worcester.

1926

Laurence B. Cheney is administrative assistant to the director of engineering at U.S. Rubber Company in New York City. . . The board of governors of the Society of Real Estate Appraisers has awarded the senior real estate appraiser designation to *Archie J. Horne* of Worcester. He is past president of the New England Chapter of the American Institute of Real Estate Appraisers. . . *Clyde W. Hubbard* was recently made a Fellow of the ASME. He is a hydraulic engineer for Stone & Webster Engineering Corporation in Boston, where he has worked since 1949. . . The Torrington Company has given *John S. Miller* the duties of assistant manufacturing manager of the Bearings Division, promoting him from superintendent of the Broad Street plant in Hartford. John will supervise a new cost and scrap reduction program which will be instituted in the division. . . *Edward Jones*' current position with the Joint Civic Agencies of Greater Springfield (Mass.), Inc. is assistant vice president and director of research. He is also executive director of the Springfield Taxpayers' Association, Inc. In this connection he gave a talk for the local chapter of the Administrative Management Society entitled "So you pay taxes, too!"

1928

John E. Driscoll (CLU) observed his 30th anniversary on December 1 with the Connecticut Mutual Life Insurance Company, where he is district manager of the Holyoke, Massachusetts office. Jack has won numerous sales and personal production awards and has earned the National Association of Life Underwriters national quality award for superior client service every year since its creation in 1944.

1931

Irving S. Newcomb decided to leave General Electric Company and now runs his own cabinet-making business at his home in Holliston, Massachusetts. . . *F. Dudley Chaffee* began new duties in a newly created post on February 1 as university engineer at the University of North Carolina. He had been at St. Lawrence University as director of the physical plant since 1958.

1933

A former General Electric Company manufacturing programmer, *W. Harvey Perreault* is vice president of the Falls Machine Screw Company of Chicopee, Massachusetts. . . *Arthur E. Smith* was elected in December a trustee of the Manchester (Conn.) Memorial Hospital, where he is also a member of the board of incorporators. Art is also active in other civic projects. . . *H. Edward Perkins, Jr.* changed to Sikorsky Aircraft Division of United Aircraft Corporation recently after association with United Nuclear Corporation in New Haven.

1935

John J. Power, Jr. begins the new year in a new spot at Automatic Sprinkler Corporation of America, Youngstown, Ohio. He takes over the presidency after 14 years' service as executive vice president. Automatic is the nation's second largest manufacturer and installer of fire prevention and protection systems.

1938

Basil C. Kimball left J. B. Lowell, Inc. to become manager of manufacturing at Worcester Stamped Metal Company. . . Dr. *Arnet L. Powell*, chief scientist of the Boston branch of the U.S. Office of Naval Research for the past five years, has been elected chairman of the Northeastern Section of the ACS for 1965. He returned in August from a seven-month research project at Oxford University, England. . . Norton Company's *Warren R. Spofford* transferred his field responsibilities as district sales supervisor of Syracuse to New England, effective January 1. *Gordon S. Brandes*, '49, takes over the spot in Syracuse. . . The town of Holden, Massachusetts, in appointing a new board of light department commissioners, selected *John G. Lawrence*. A graduate of Tech's SIM in 1958 and a registered professional engineer, he is electrical engineer for Coghlin's Inc. of Worcester.

1939

Charles S. Stevens' relatives in Worcester were informed that he and his family were unharmed in the Bolivian revolt in November. The Stevens, Mr. and Mrs., work in the LaPaz area. Charles is superintendent of the Alliance for International Progress program and his wife is director of the Anglo-American School. . . *Norman W. Stewart*, elected state commander of the American Legion last June, was feted by more than 1000 members from all parts of Massachusetts at a testimonial dinner on November 28. . . *Fred J. Kraemer, Jr.*, whose location had been unknown to us for the past few years, is president of Dennison & Sons, a firm in Long Island City, New York.

1942

Gordon J. Chaffee, his father (*Leslie J.*, '16) writes, is still busily engaged as a project engineer with the Weyerhaeuser Company. He is based in the engineers office in Tacoma, Washington, but travels extensively to various saw mills in California, Oregon, Washington, and Idaho.

1943

Having been "address not known" since 1957, we were happy to discover *Reed C. Fulton* in Wrentham, Massachusetts. He is supervisor of combustion research at M.I.T.

1944

Charles A. Anderson's present position with General Electric Company is foreman of apprentice training at the Lynn, Massachusetts facilities.

1946

James H. Maloney, Jr. has been sent to Bala Cynwyd, Pennsylvania from Milwaukee by the Geo. J. Meyer Manufacturing Company. This is Jim's second assignment in Pennsylvania, where previously he served in the Philadelphia office. . . *Roger H. Brown* left Chicago and became supervisor of munitions development at the Nortronics Division of Northrop Corporation in Anaheim, California. . . The Honeywell EDP Division branch manager in Cleveland is *Richard M. Underwood, Jr.*, formerly of Wellesley Hills, Massachusetts. . . Dr. *Leon J. Lidofsky* published with a co-author a paper in *The Physical Review* for December 21. . . *M. Daniel Lacedonia*, active in local civic affairs since he moved there 13 years ago, is the new president of the East Longmeadow (Mass.) Lions Club. . . *Truman S. Dayton* informed us recently of his appointment as Boston district manager of the American Appraisal Company.

1946D

Robert C. Taylor's position of design supervisor has been changed to that of chief engineer at Lombard Industries, Ashland, Massachusetts.

1948

Eastman Kodak Company became the employer of *Thomas H. Grove, Jr.* when he left Spencer Packaging Company in Orangeburg, New York. . . Rodney Hunt Machine Company announced in December the appointment of *Robert W. Henderson* as manager of its water control equipment division. He will be responsible for

the sales and marketing of the more than 3000 products in this field. . . Prof. *Kenneth E. Scott* of W.P.I. is serving as state chairman for the guidance committee of the Engineers' Council for Professional Development. . . G & W Electric Specialty Company's project manager—switchgears is *Joseph R. McBride*, a veteran employee of General Electric Company. He is located in the LaGrange, Illinois area. . . *Robert W. Nikander's* sales engineering position with GE was traded in for one with C. A. Briggs Associates in Glenside, Pennsylvania. . . Another former GE employee is *Charles A. Woodman*, who left industry to become a teacher of physics at Wakefield (Mass.) High School. . . Borden Chemical Company has created the new position of assistant general manager of the Thermoplastics Division and appointed *Romeo J. Ventres* to fill it. He will have supervision over production, development, and technical service and engineering in two departments.

1949

Bliss-Rockwood Division of E. W. Bliss Company has upped *James F. O'Regan* from sales manager of the fire protection department to general sales manager of the entire division. . . Effective January 1, *Gordon S. Brandes* became district sales supervisor in Syracuse for Norton Company after enjoying similar duties in eastern Massachusetts and Maine. *Warren R. Spofford*, '38, leaves the Syracuse post to take over New England. . . Wyman-Gordon Company's newest promotions included *Thomas R. Carlin*, now general manager of purchases. He had been appointed assistant manager in 1964.

1950

After experience at Space Technology Labs in California, *William D. Young* became earth station manager of Communications Satellite Corporation, Washington, D. C. . . *Paul M. A. Schonning* left Worcester Pressed Steel Company to take on the responsibilities of plant engineer for Phalo Corporation in Shrewsbury. . . *Bronislaw B. Kuprewicz, Jr.* was transferred from his Fitchburg, Massachusetts post at GE to Schenectady. . . *James C. J. Sullivan* is presently a project engineer with Anderson-Nichols Company, Inc. in Boston. Before this he served Boston Edison Company.

1951

Walter J. Kolodne, a former New Yorker, has taken a post as construction engineer with Wagman Construction Corporation in Rockville, Maryland. . . *Marden H. Seavey, Jr.* is now a research physicist at the Air Force Cambridge Research Lab located at the L. G. Hanscom Field in Bedford, Massachusetts. . . *Henry D. Taylor*, after service with General Electric Company in Lynn, Massachusetts, has become a project engineer with Vickers, Inc. in Waterbury, Connecticut.

Here's a news item for "Your Class and Others":

Write some news of your business, family or other Tech Alumni and then clip out and mail to the Alumni Office, W. P. I. Don't be bashful, let's hear from you.

1952

The executive vice president of Cape Colony Builders, Inc. in Chatham, Massachusetts is *Paul B. Edwards*, who goes to Cape Cod from Worcester. . . Worcester's Wyman-Gordon Company lost *George F. Whittle* to Haveg Industries of Taunton, Massachusetts, where he is a sales engineer.

1953

Kenneth M. Healy returned to his native Leominster, Massachusetts and is developing a participant sports recreation area. As starters he includes skiing, skating, swimming and golf. . . W.P.I. Prof. *Robert W. Fitzgerald's* Worcester Naval Reserve Unit placed first in district competition for the second straight year and nationally rose from sixth to second place in competition with 200 similar units. Bob is commanding officer of the outfit.

1954

Walter A. Reibling took a position as senior equipment engineer with Corning Glass Works, located at Wellsboro, Pennsylvania. . . New England Tel. & Tel. Company transferred *Charles J. Simonich* to Springfield, Massachusetts from Boston. He became outside plant engineer—staff. . . Late November brought the announcement that *Wilfred F. Taylor* had been appointed town engineer of Barnstable, Massachusetts. . . A senior engineer, *Richard S. Raymond* is with the Northrop Corporation, Nortronics Division, in Needham Heights, Massachusetts. . . *B. Lawrence Sova, Jr.*, an engineer at the Aberdeen Proving Grounds, Maryland, was presented an award in recognition of his work in developing the Army nuclear power plant system. He was selected for inclusion in the first edition of Who's Who in the Electronics Industry in 1960–61.

1955

David S. Dayton has taken up duties as vice president of Technical Communications Corporation in Lexington, Massachusetts. He left Raytheon Company as assistant to the secretary. . . *Gordon E. Walters* became department head of factory engineering at Sprague Electric Company, it was announced in November. He has been with Sprague since early 1963.

1956

Married: Joseph J. Cimerol, Jr. and Miss Angela F. Conte of Hamden, Connecticut, November 28, 1964. Joe is employed by Olin Mathieson Chemical Company in New Haven. . . *James C. Kubik* and Miss Elizabeth C. Buckley of Worcester, December 28, 1964. Mrs. Kubik's brother is *John M. Buckley*, '61.

A relocation to Tennessee begins the New Year for *Frederick F. Hering III*, project engineer for Sperry-Farragut Company. New Jersey was his former home, and Walter Kidde & Company, Inc. his former employer. . . *James W. Green's* new position is at Whitin Machine Works, Whitinsville, Massachusetts, in the design-development engineering department. He is a former representative for Sheldon Machine Company.

1957

Married: John M. Hoban and Miss Carole A. Kennedy of Yonkers, New York, February 1965.

Sales Engineer *James F. Fournier* has been sent to Los Angeles for Geo. J. Meyer Manufacturing Company. . . *George Klimchak* is temporarily located in Hartford, Connecticut with Universal Design, Inc. as a structural engineer. . . The end of the year brought a close to *John G. Smith's* association with Sanborn Company. He is now a design engineer with Raytheon Company in Sudbury, Massachusetts. *Richard E. Wright* is also listed among Raytheon's employees at that location. . . Norton Company named *Edward J. Foley* in December as foreman in the fines department of the Abrasives Division. . . An April wedding is in the making for *John P. Densler* and Miss Gail Bond of Boston. . . The latest we have on *Charles I. Friedman* is that he works for Computer Control Corporation and lives in Framingham, Massachusetts.

1958

Dr. *Joseph E. Boggio* finished his post-doctoral work at Brown University and is now an instructor in the Chemistry Department at Fairfield University. . . General Dynamics Corporation recruited *Neil M. Carignan* to its ranks as structural engineer at the Electric Boat Division, while *Perry E. Joslin* leaves it to become a research engineer for Pratt & Whitney Company, Inc. in Hartford. . . *Frank F. Chin* has returned to his Boston location after completion of a temporary assignment at Mount Storm, Virginia for Stone & Webster Engineering Corporation. . . *William E. Griffiths* was named to head the 1965 March of Dimes in his town, Westminster, Massachusetts. He is affiliated with Hedstrom Union Company of Fitchburg. . . *Richard A. Lisbon* returned east more than a year ago from California and now works for E. R. Squibb & Sons in New Brunswick, New Jersey. . . *James S. Demetry* remains at the U.S. Naval Postgraduate School as an assistant professor after receiving a doctorate there recently. . . *Wayne Mosman* transferred from Monsanto Research Corporation (a subsidiary of Monsanto Company), Mound Lab in Miamisburg, Ohio to its Dayton Lab. . . Sales Engineering with The Trane Company preceded *Harvey M. Robbin's* position as an estimator for the Morris A. Fierberg Company in Hartford, Connecticut. . . Economy Electric Supply Company's assistant manager is *Robert W. Weinberg*, formerly with Skinner Precision Industries, Inc. Economy is located in Manchester, Connecticut. . . *Jasper Freese* stopped in during his Christmas vacation at home to inform us of his connection with the California Department of Water Resources at Los Angeles. . . *Paul Dalton's* position at Monsanto Company, Hartford, is now that of Manager—sheet and film processes and products.

1959

Married: Joseph D. Daddario, Jr. and Miss Patricia A. Tigue of Franklin, Massachusetts, November 28, 1964. Joe is with the Waltham (Mass.) branch of the Boeing Company. . . *Seymour Ellin* and Miss Barbara J. Golden of New York City, November 27, 1964. The groom is with RCA in Boston.

Born: To Mr. and Mrs. *Ronald F. Swenson*, their second child and daughter, Jeanette Laura, on July 31, 1964. . . To Mr. and Mrs. *Joseph D. Bronzino*, their second child and first daughter, Melissa Jo, on January 5, 1965.

Leaving Manson Laboratories in Connecticut, *Neil T. Buske* joined Niagara Mohawk Power Corporation in Syracuse, New York. . . *Donald C. Gove* is associated with Trans-Sonics, Inc. in Burlington, Massachusetts as a senior engineer. . . *Stanley M. Wallner* moved to New Haven, Connecticut from Rochester to continue his duties as technical sales representative for Fisher Scientific Company. . . General Electric Company in Phoenix lost *Ernest F. Woodtli* to Control Data Corporation of Minneapolis. . . Having graduated from Dartmouth's Amos Tuck School last June, *A. David Dickert* secured employment with The Rohm & Haas Company in Philadelphia. . . Equipped with a master's degree in industrial administration from Carnegie Tech, *Burnham H. Baker* is now a senior administrative engineer with Honeywell's EDP Division in Newton, Massachusetts. . . *Norman A. Hiatt* and Miss Barbara Weininger plan a June wedding. Norm is working toward a doctorate at Lowell Tech. . . His Pittsfield, Massachusetts assignment ended, *William H. Bailey* was transferred to Schenectady by GE.

1960

Married: Prof. *Robert A. Chechile* and Miss Irene K. Clapper of Springfield, Massachusetts, November 26, 1964. Bob is still teaching at Western New England College. . . *Murray L. Elowitz* and Miss Phyllis C. Unger of Kansas City, Missouri, November 22, 1964.

Born: To Mr. and Mrs. *Frederick W. Kloiber*, their second child and daughter, Anita Jean, on November 28, 1964. Fred and the family live in Florida, where he is with General Electric Company's Apollo Support Department in Daytona Beach. . . To Mr. and Mrs. *William L. Brown*, their first child and son, Mark Michael, on November 1, 1964.

Avco Corporation offered *F. Gary Augeri* a test engineering position, which he accepted after leaving Baird-Atomics, Inc. . . Baird also lost *Charles Lipson* when he went to Raytheon Company, Bedford, Massachusetts. . . *Thomas F. Zimmie* also leaves the service and Fort Belvoir, Virginia and now works for the Linde Company Division of Union Carbide Corporation in Tonawanda, New York. . . *Paul E. Honer* was named branch manager of Robertshaw Controls Com-

pany's Control Systems Division, Philadelphia area office, in November. . . *John T. Manchester* left Boston Gear works to become a mechanical engineer for Hazeltine Corporation, Braintree, Massachusetts. . . *Robert J. McElroy* joined the Peace Corps, thereby becoming the second W.P.I. graduate to volunteer. Bob was sent to Manila. . . The *Fidele L. DiPippos* were sent from Phoenix to the Cincinnati area by GE, where Fred is in the manufacturing training program. . . *Paul C. Miller* is associated with Windle Engineering Company, Millbury, Massachusetts, so says a clipping announcing his engagement to Miss Jean B. Sheldon. . . Since leaving the U.S. Naval Propellant Plant in Maryland, *William F. Walsh* has become an experimental engineer at Pratt & Whitney Aircraft.

1961

Married: Edward J. Boduch and Miss Marguerite L. Sonnier of Basile, Louisiana. Ed is in his last year at Dartmouth's Amos Tuck School.

Born: To Mr. and Mrs. *Paul J. McCarthy,* their first child and daughter, Linda Mary, on November 3, 1964.

H. Richard Freeman is making his contribution to the space effort by working in system engineering at the Goddard Space Flight Center in Greenbelt, Maryland. . . *David W. Prosser,* former assistant sanitary engineer, received new duties as assistant district engineer with the New York State Health Department's Geneva office. . . *John Brylczyk* has returned stateside from Germany, where he was stationed with the Army, and accepted a post with Grumman Aircraft Engineering Corporation, Bethpage, New York. . . Miss Emily A. Cathcart is the fiancee of *Malcolm E. Low,* a student at Boston University and an employee of the engineering firm Trans-Sonics, Inc.

If your name has not appeared in this section lately, turn to page 21, upper right-hand corner. Let's hear from you.

in Burlington, Massachusetts. June is the time set for the wedding. . . *Paul S. Sledzik* returned to General Electric Company after his Army tour of duty ended in June, served at Schenectady, and is presently at West Lynn, Massachusetts.

1962

Married: Howard L. McGill, Jr. and Miss Grace A. Tabacco of Andover, Massachusetts, February 1965. . . *James H. Mayer* and Miss Kathe Kahn of New Rochelle, New York, January 2, 1965.

Born: To Mr. and Mrs. *Richard D. Hartley,* their first child and daughter, Susan, on November 28, 1964. Dick is studying for a master's degree at UConn.

Nicholas Cotsidas became vice president of Table Talk Pastry Company, Inc. in Worcester after completing his tour of duty with the Army. . . His tour also completed, *Michael M. Kaufmann* goes to E. W. Bliss Company in Canton, Ohio. . . *R. Michael Leistritz* was released from active Navy duty and returned home to Fitchburg, Massachusetts. He commutes daily to his work at Metcalf & Eddy, Boston. . . *Stephen M. Wells'* army career

ended this January and in February he began study toward an M.B.A. degree at Columbia's School of Business. . . *James D. Quirk* is back to school after working at General Electric Company. He is a student and teaching assistant at the University of New Hampshire. . . *J. Lee Wakefield* is employed by Teletype Corporation in Skokie, Illinois, where he is a sales engineer. . . *Joseph J. Baldasaro* has taken a new position with Socony Mobil Oil Company in the Brooklyn refinery. Consolidated Edison of New York, Inc. was his former employer. . . *Albert M. Rockwell, Jr.* is working in Bristol, Connecticut with Carson Laboratories, Inc. as a staff member. . . *Paul M. Goranson* recently returned from Ghana after two years in the Peace Corps. He was guest speaker at a December meeting of a local high school's International Affairs Club and also addressed the sociology classes. Shortly after he became a teacher at the North Carolina Advancement School in Winston-Salem. . . A June wedding is in store for *Kenneth A. Homon* and Miss Barbara J. Matuzek, whose brother is *Conrad F. Matuzek*, '61. . . June ceremonies will also unite *Daniel G. Webster* and Miss Jean Duncanson; and *David J. McGuinness* and Miss Ann T. Morrissey.

1963

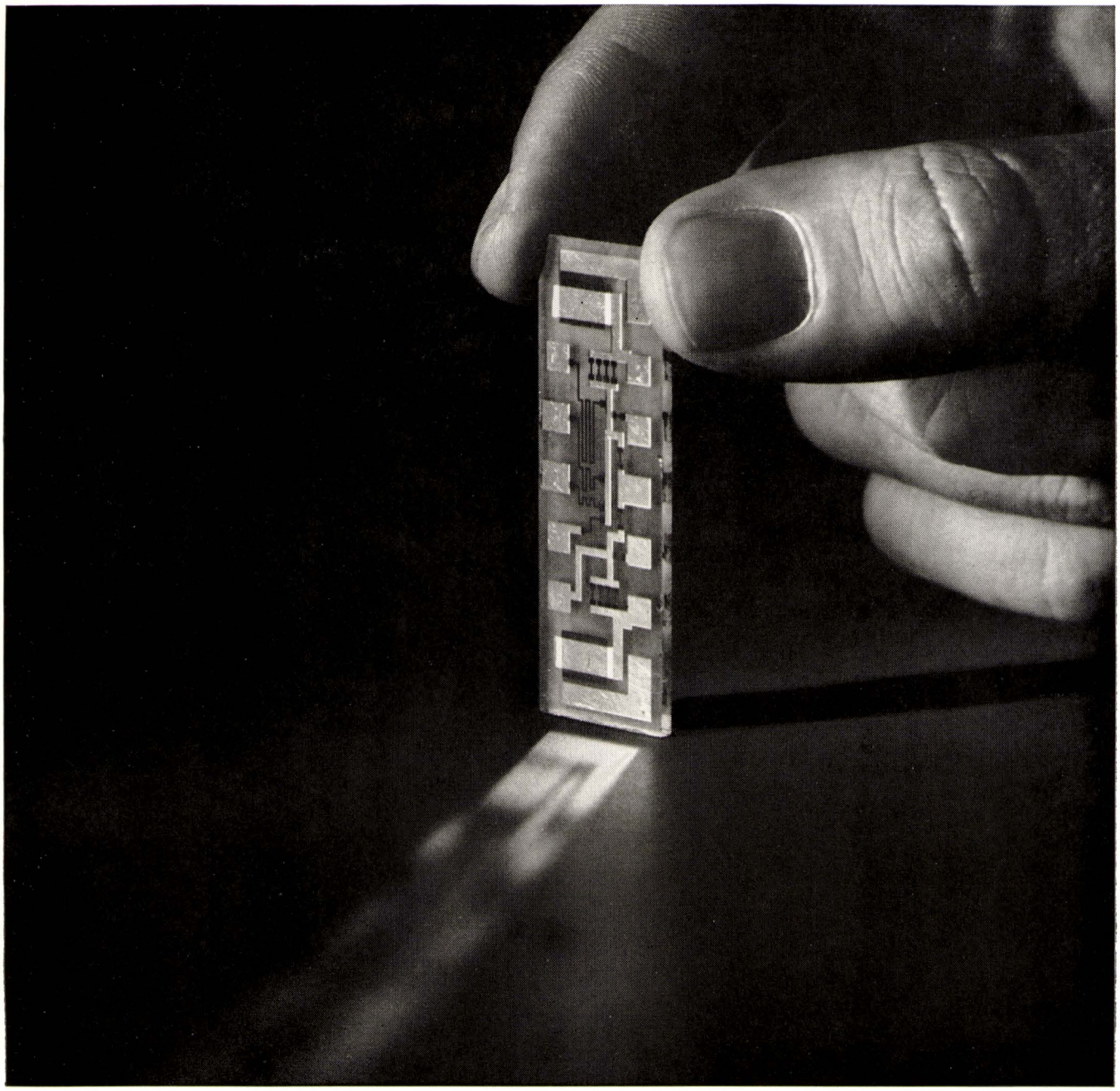
Married: Frank S. Reynolds and Miss Carolyn A. Herzfeld of Poughkeepsie, New York, December 27, 1964. The couple will reside at East Lansing, Michigan, while Frank completes graduate study at Michigan State. . . *Brian W. Phillips* and Miss Sandra L. Coleman of Auburn, Massachusetts, January 29, 1965. . . *Donald L. Chaffee* and Miss Lorraine Ford of Tacoma, Washington. Don obtained his master's degree from the University of Washington last summer and now works for the U.S. Navy at Port Hueneme, California.

Joseph J. Mielinski, Jr. became a process supervisor in Furfural products for E. I. Dupont in Niagara, New York in a recent promotion. . . *Bruce G. Goodale* received his master's degree in civil engineering from the University of Illinois in August and began as assistant hydraulic engineer at the New York State Division of Water Resources in West Seneca. . . *Charles M. Beck II* enters the seminary this February to study for the pastoral ministry. . . Lt. *James A. Velezis* of the Army is stationed at Fort Huachuca. . . PFC *Gordon W. Whitten*, stationed at Fort Bliss, was awarded the Soldier of the Quarter trophy after defeating competitors in a board selection and interview by his colonel. . . The wedding of Lt. *Stuart D. Batstone* and Miss Ruth A. Plubell will take place on April 10. Stu is serving at Fort Sill presently. . . An early spring wedding is planned by *Arthur S. Ross III* and Miss Nancy Heffron. . . June wedding bells will ring for Cadet *Grosvenor W. Fish, Jr.* of West Point and Miss Judith L. Amick.

1964

Married: John W. Oldham, Jr. and Miss Patricia G. Charlesworth of Pasadena, California, November 20, 1964. . . *Brian A. Wells* and Miss Barbara S. Ferrechio of Clinton, Massachusetts, January 24, 1965. Brian is with the New York State Department of Public Works in Poughkeepsie. . . *James P. Greene, Jr.* and Miss Carolyn Gould of Beacon Falls, Connecticut, February 1965.

F. Barry Sylvia is an associate engineer for General Foods Corporation in Dover, Delaware. . . Morgan Construction Company recently appointed *Willard R. Davis* (SIM) works manager after service as systems manager. . . Aside from his graduate work at the Institute, *Christopher R. Almy* owns and operates Marblehead (Mass.) Custom Engineering. During his first three years as an undergraduate, Chris was owner of the Marblehead Marine Gifts Products Company. . . *Edward R. Mencow* is continuing his studies under a fellowship grant at R.P.I., while *Charles J. Lombardo* is in graduate work at Northeastern University. . . *Mason H. Somerville*, attending graduate school at Northeastern, is engaged to Miss Mary Ellen Bell of Worcester, daughter of *Harold B. Bell*, '34. Also attending Northeastern is *Stephen C. Noble*, a fraternity brother of Mason Somerville and his future brother-in-law. Steve recently became engaged to Miss Marion Somerville, Mason's sister. The weddings will take place a week apart in June. . . Other engagements: *Louis A. Lemone*, a graduate student at Tufts University, and Miss Karen A. Brassil. *Raymond G. Dube* and Miss Marie E. Lanza. *Richard G. Carle* and Miss Norene C. Najemy. . . Lts. *Paul S. Krantz, Jr.* and *Kenneth N. Robbins* have completed their eight-week course at Fort Gordon. . . Lt. *E. James Hanna III* has been sent to the Wright-Patterson AFB, Ohio, and *David V. Helsing*, who has seen service in the Far East, has been assigned to White Sands Missile Range, New Mexico. . . January 15 ended Lt. *Gerald E. Tammi's* Christmas leave and began a new tour of duty in Alaska after service at Fort Lewis.



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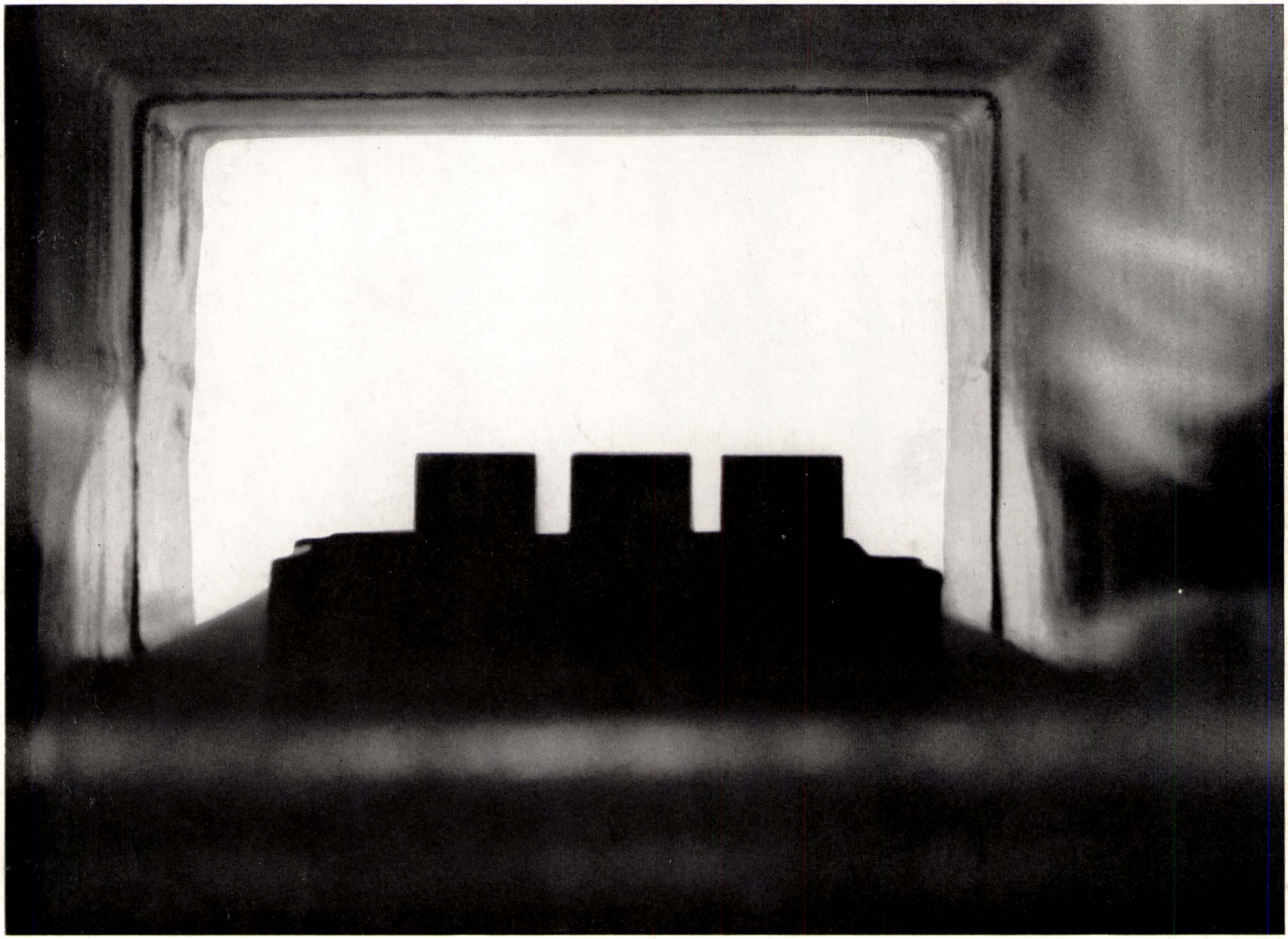

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