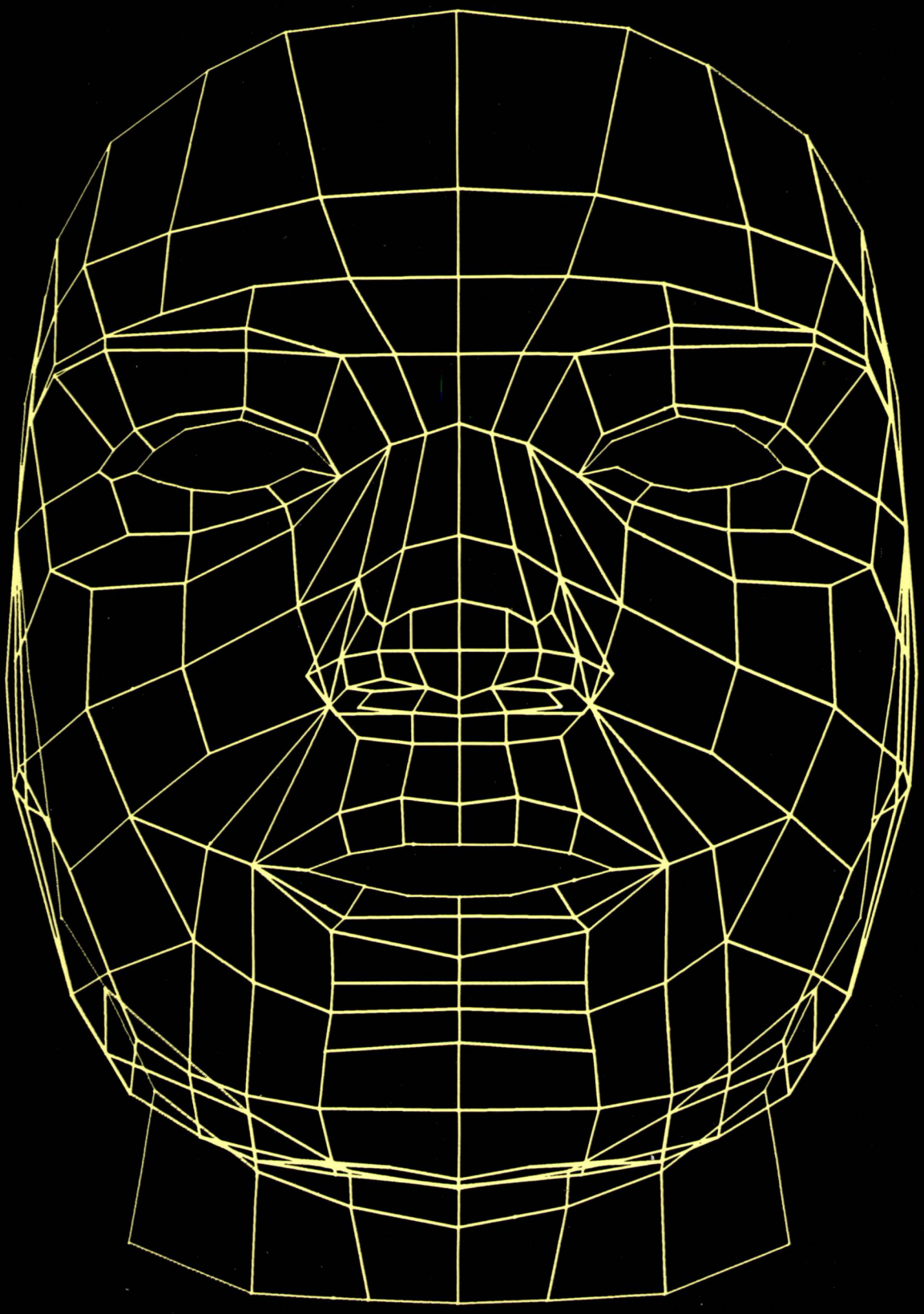
April 1973
Vol. 76, No. 6

JOURNAL



WPI JOURNAL

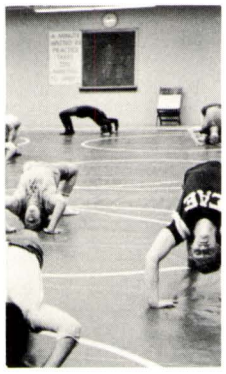
Vol. 76, No. 6 April, 1973

Departments

The Cover: That's Mrs. Fred Parke on the cover this month—at least it's a computerized representation of her. For more details, see page 8.

2

8



18

15

Editor: H. Russell Kay

Alumni Information Editor: Ruth A. Trask

Publications Committee: Walter B. Dennen, Jr., '51, Chairman; Donald F. Berth, '56; Richard DeChard, '56; Robert C. Gosling, '68; Enfried T. Larson, '22; Roger N. Perry, Jr., '45; Rev. Edward I. Swanson, '45

Design: H. Russell Kay

Typography and printing: Davis Press, Worcester, Massachusetts.

Address all correspondence regarding editorial content or advertising to the Editor, *WPI Journal*, Worcester Polytechnic Institute, Worcester, Massachusetts 01609 (phone 617-753-1411).

The *WPI Journal* is published six times a year in August, September, October, December, February, and April. Second Class postage paid at Worcester, Massachusetts. Postmaster: Please send form 3579 to Alumni Association, Worcester Polytechnic Institute, Worcester, Massachusetts 01609

Before and After

THE STUDENT-ALUMNI RELATIONSHIP

The WPI Community embraces several groups, including students, faculty, and administration. There is another, equally important group, namely alumni, which is an integral part of the total community. Since most alumni are not on campus as much as the others, they are frequently overlooked by students and innocently forgotten as a part of WPI.

Students usually find it difficult to relate to the fact that someday they are going to be alumni of WPI themselves. Foremost in the minds of undergraduates are the thoughts of graduating, of finding some form of placement and beginning other new endeavors, but few thoughts are directed towards their relationship to or contact with WPI once they graduate. Only after being away from the Hill for a while do recent graduates start to think of their roles as alumni. But this is really too late. Students should be aware of alumni, and the fact that they will someday join the Alumni Association, while they are still undergraduates on campus. The attitudes of many older alumni towards WPI are developed during their undergraduate years. It is therefore extremely important that the proper knowledge and attitudes between the school and alumni be inculcated while students are still on campus.

In addition to undergraduates being aware of alumni, alumni must also be aware of students, of new campus trends, and of current college life. Students and alumni should have a good mutual understanding, generally referred to as "Student – Alumni Relations."

The big question both students and alumni might be asking is "Why should we care?" But for just a minute let's think of the school as a manufacturer, the students as raw materials, and the alumni as the finished products. As in business, all three elements must be of high quality and must interact with each other to be successful. Returning, then, to the school, how can students, alumni, faculty, and administration best interact for maximum mutual benefit?

Alumni help to determine school policy, as alumni term members of the Board of Trustees. The Alumni Association and all alumni give both financial and non-financial support to WPI, without which it would be extremely difficult for the College to operate.

Alumni, in turn, benefit through good fellowship and, when needed, second careers placement. Alumni can be instrumental in organizing projects with their companies for students on the WPI Plan. They can also give guidance to job-hunting seniors.

Several new programs to further student – alumni relations are in either the planning or implementing stages. A booklet is being prepared for undergraduates which will describe the basic purpose, organization and function of the Alumni Association. This will help to make the undergraduates more knowledgeable and perhaps better alumni. An alumni counseling program is in the organizational stages and will list those alumni who are willing to give help to students in particular areas, whether academic or non-academic. For example, one category might be student activities. There would be a list of alumni who were active as students in campus activities and who could be consulted by students currently involved. Another category might be career counseling in, say, sales engineering etc. A student who aspires to a career in sales could ask an alumnus active in the field what life is really like. To build these files, we will need alumni who are willing to be contacted by students. Another program is an already existing alumni column in the Tech News where alumni can write articles, students can interview alumni, and articles can be published informing students of current happenings with the Alumni Association. These are but a few of the programs now under consideration, implementation, or operation. But we need more.

Ideas and programs are fine but support and action are what is really needed to further student – alumni relations. In order to develop good future alumni, students must be informed while still on campus as to the concepts of the Alumni Association. Much interaction is needed between alumni and students to bridge any possible (oh, the old expression!) generation gap. The more communication, the better the understanding, and it will hopefully benefit the entire WPI community.

Leonard Polizzotto '70
Chairman, Student-Alumni Relations Committee
WPI Alumni Association

LEARNING

by Kenneth E. Scott, '48
and Russell Kay

Courses and classwork just ain't what they used to be. To be sure, there are still lectures in big halls, and laboratories too, but a revolution is sweeping the classrooms at WPI.

A Carnegie Corporation study called it "The Fourth Revolution: Instructional Technology in Higher Education." The *Simmons Review* put it better: "The lamp of learning is wired for sight and sound."

In the past three years at WPI, instructional procedures have undergone some drastic modifications and alterations, starting from the traditional classroom lecture and fixed laboratory programs and adding in increasing amounts of modern technology.

It may seem a bit strange that a college geared to education *for* technology should wait until the 1970s to really begin education *using* technology. This timing is probably due to two factors. First was the renewal of the college with the adoption and implementation of the WPI Plan. Rethinking the basic structure of education for a technologically based world inevitably led to a reexamination of teaching methods and procedures. New demands on faculty and students alike led to a search for ever more efficient ways of using available time, people, and other resources.

The second reason that new instructional technology hit so hard at this time was that the technology itself for effecting the changes was ready – it was available, affordable, and its possibilities were just beginning to be realized across the country.

Where Have All the Slide Rules Gone?

It used to be a campus cliché, especially at large universities, that you could always tell an engineering student by the leather slide-rule holster dangling from his belt. While that is probably still true right now, in a few years the slide rule may become a collectors' item. The reason, of course, is the pocket-sized electronic calculator. It is faster, more accurate, easier to use, it remembers decimal points – and it costs more. But not all that much more, and the prices keep coming down.

Mechanical Engineering Department Head Donald Zwiep is working on a program (still in the planning stages) that would make one of these "electronic slide rules" available to each entering student (beginning next fall) for an annual fee of perhaps $25 – and on graduation the total rental the student has paid will be applicable to the purchase of the instrument. Right now, calculators are available for general use at the Gordon Library, and WPI Bookstore manager Harry Thompson says he plans to carry calculators in stock immediately.

The Coming of the Computer

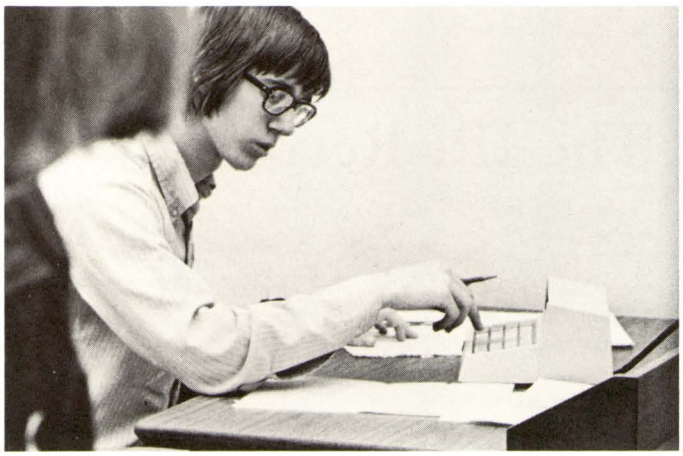
Someone recently made the statement that in five years a knowledge of computer programming would be as basic a skill to the average student as typing is today. A lot of publicity has been given in the last year to Dartmouth College's large new computer center and the fact that it is widely used by all facets of their student body. Well, perhaps that is unusual for Dartmouth. At WPI there have been time-sharing terminals and computer time available to students since 1969, and a student's ability to use the computer is taken for granted.

Those original time-sharing capabilities were embodied in the RCA (now Univac) Spectra 70/46, which was used primarily for batch processing. At that time the available terminals were located in WACCC (the Worcester Area College Computation Center) itself. Temporary hookups were later made that allowed terminals to be placed in Salisbury Laboratories and Kaven Hall, but these have since been superseded by a permanent underground communications network installed last summer.

In January of 1972 a new computer, the DEC system 10-50, was installed for exclusive time-sharing use. As of this writing there are sixteen hardwired computer terminals available on campus at five different locations, including one which is open twenty-four hours a day. In addition to these, there are many other terminals on campus which tie in by acoustical coupler and telephone. The DEC 10 has a capability of handling 48 terminals, and to make better use of the computer several other area colleges are also tied in.

To help his students become accustomed to using the computer, Professor A. F. Chalabi of the civil engineering department regularly uses a terminal during class time for his courses in "Matrix Computer Analysis of Structures" and "Design of Reinforced Concrete Structural Systems." He plans to expand this type of use. To be sure, there is some danger in this because students have been known to rely on the

Kenneth E. Scott, '48, is professor of mechanical engineering, Institute director of audiovisual development, and George I. Alden professor of engineering. Russell Kay is Director of Publications.



how to teach how to learn

computer to solve problems that would be better – and faster – handled with a few minutes at a small calculator.

Training in the use of the computer is aided by several videotaped programs, which teach operation of certain ancillary equipment and aspects of some of the commonly used computer languages.

Video, Stage One

The single biggest factor in the learning revolution at WPI has been television – videotaped, closed-circuit, cable-connected, dial-up-access. Video on campus is used extremely widely – not for entertainment, not for training future broadcasters, but for solid instruction in just about every field of study WPI offers.

The beginnings of television at WPI were told in the spring 1971 *WPI Journal*, in "The Education of the Idiot Box." At that time there was a rudimentary video studio, and a few faculty members were exploring the possible pedagogical uses of the medium. There was one viewing station available to students in the library.

Television use and Individually Prescribed Instruction (IPI, see box) developed side by side here. In order to be successful, a great deal of planning and preparation must go into the development of an IPI course, and this normally includes the preparation of videotapes. Dr. Harit Majmudar of the electrical engineering department pioneered the use of videotapes to support work in a power engineering course. Although it was not considered an IPI course at the time, it had many of the earmarks of the IPI approach.

One of the earliest IPI courses, one which brought about perhaps the biggest changes, was in the area of control engineering. For several years various faculty members had considered giving a single, cross-discipline course sequence in control engineering, but this never came to pass for the usual variety of reasons. With the emergence of IPI, however, and with the incentive for innovation which the WPI Plan created, the usual objections were now overturned and a cross-disciplinary IPI course was instituted.

This course placed heavy reliance on multimedia instructional aids. The most useful and valuable instructional tool proved to be videotape. Although some tapes were prepared in advance to present certain types of material, the instructors of the course found an unexpected student demand for many more short videotapes. Students wanted tapes to clarify points, explain principles, or just to detail a shortcut approach. Because of this, two distinct types of viewing stations were needed. There were those in the library for general use, and there were specific stations in the laboratory, adjacent to such equipment as the analog computer and servo kits.

Video, Stage Two

During that spring 1971 semester, there was one viewing station in the library. Only a few courses were being offered using IPI, and these involved perhaps 200 students. At that time the use of video was still considered experimental.

More courses were planned for IPI, and during the summer of 1971 many more videotapes were produced. In May 1971, Professor Kenneth Scott of the mechanical engineering department was appointed half-time to administer and direct the Institute's development of audiovisual resources. In July of that year Herman Dumas, an electronics technician, was hired to supervise the studio, maintain the equipment, and assist the audiovisual program in general. The studio in Higgins Lab was updated, and significant new equipment was added. (By the way, there is no truth to the rumor that Scott and Dumas are referred to now as Captain Video and the Video Ranger. . . .)

A small room in the library was prepared to accommodate viewing stations; by spring 1972 five of these were in constant use and the room was overcrowded. Over last summer a much larger learning center was created in the library, capable of holding up to fifteen viewing stations. Right now there are

The IPI Revolution

In spring of 1971 several courses were first offered in a new format, called Individually Prescribed Instruction (IPI).

The IPI method represents a complete change from the usual lecture-instructor-classroom-centered instruction to a student-centered, self-paced learning format. Each student works at his own pace, mastering the course material in a prearranged sequence, one unit at a time. The only requirement is that he must demonstrate his ability in one unit before he is allowed to move on to the next unit and more advanced material. When the student feels ready, he comes to a learning laboratory where he takes an assessment (once upon a time it would have been called a test) on that unit. The assessment is immediately corrected in a one-to-one student-instructor relationship. If the student demonstrates mastery of the material, he is passed and immediately goes on to the next unit of instruction. If not, he goes back over the same unit until he masters it and passes a different assessment. The beauty of the system is that a student is never allowed to get in over his head. Student-to-student tutoring is an important part of the IPI program.

Each IPI study unit contains an introduction, a well-defined set of objectives, a list of instructional aids, illustrative problems, study problems with answers, and the types of response expected of the student. The instructional aids may include a primary course textbook, reference texts, programmed-learning manuals, videotapes, audio tapes, and/or computer programs. The student has a high degree of freedom with respect to choosing how, what, where, and when he studies. The responsibility for learning is where it must be, squarely on the shoulders of the student himself.

But what about the students' point of view? There are conflicting feelings, and a small minority of students seem unable to adjust successfully to the kind of self-discipline required in an IPI course. Most students, though, are in favor of the system.

"IPI changes the student from a passive to an active learner. It is relatively easy to sit in class and listen to three lectures a week. In IPI you have to make an active commitment to the material if you're going to get anywhere. You can't just barely pass—you have to master each increment of the material. You build up confidence with the material because you learn on your own. You also get more out of the instructor because you are working on a one-to-one basis. You get to use the faculty member more to your advantage. IPI is more in line with the way things are in the real world. You take on a real project and know what's expected of you at the end of the term. It takes initiative, but you progress at your own rate." That's what Ed Peczynski, '73, had to say after taking his first two IPI courses last year and tutoring one other. He continues:

"Tutoring a course helps the tutor as much as the tutee. You have to really know and master the material to tutor. You get to see things from a different point of view than when you first studied the material and thought you had mastered it. Students seem more responsive to their peers as tutors rather than faculty members."

"You get lots of confidence out of learning on your own. You learn a lot about yourself and about how to attack the course. I will take as many IPI courses as are available. Not every course should be taught this way, but it provides a good balance in your program. It makes for a more varied and interesting atmosphere to combine various methods of learning."

eleven stations in operation in that room. The center is open fifteen hours a day, but even so there are not enough viewing stations to satisfy needs in the immediate future. This year approximately twenty courses were taught in the IPI format, involving some 3,000 students. At present over 400 videotapes are available in the library learning center for student use. During Term A this year, an average of 97 students viewed at least one videotape every day (including Sundays) at the learning center.

Videotapes are also being used in many traditional format courses. Some faculty members videotape solutions to homework problems; others tape answers to examinations, and make these tapes available immediately after the exam. The advent of seven-week terms at WPI has meant the complete revision of many courses, and the problems of adapting to the new timetable have been many. One beneficial result of this has been the determined search for more efficient ways to use available time. Video has been one significant means of increasing efficiency and learning.

Other Media. . .

Video is not the only audiovisual aid being used. One faculty member is employing audio-tutorial methods to teach his laboratory course in sanitary engineering. He prepares audio cassette tapes which are used to direct students performing experiments in the laboratory. Other faculty are using audio cassettes as a means of giving directions to students as they begin laboratory work. In all cases, the use of audio-tutorial methods has made it possible for students to come to the laboratory when *they* are ready to perform the work.

Other faculty are experimenting with the use of synchronized sight/sound equipment, using 2 x 2 color slides and audio cassettes.

Video, Stage Three: The Cable

The next logical step in the development of educational video is the setting up of a campus-wide closed-circuit cable TV system. During the summer of 1972 the WPI campus was wired for learning. Underground conduits and cables connect all campus buildings to provide for present and future needs for closed-circuit cable TV and for hardwired remote computer terminals.

Right now a skeleton cable TV system is being installed. The learning laboratory in Higgins Lab is now using an

experimental "dial-up" system: the instructor telephones the TV studio and requests a specific videotape, which is broadcast from the studio to a monitor in the learning lab. There is great potential for this type of use of the cable; Oral Roberts University in Oklahoma has an extensive computer-organized random-access video cable system which works in similar fashion, though on a much larger and more sophisticated scale.

There are many other projected uses for the cable system. Communications on campus need improving, and the cable system can enable the broadcast of general information, announcements, and messages. Video could be transmitted from any location on campus to the TV studio for taping. A student access channel can be established, for discussion, presentations, editorials, and entertainment. (There exist, by the way, several vigorous, student-oriented "underground" networks based on the use of ½-inch videotape. Recent programs from one of these agencies have included appearances by such diverse and controversial people as Lieutenant William Calley and Abbie Hoffman, Ralph Nader and Bernadette Devlin, Julian Bond and Dick Gregory, not to mention "Films for Consenting Adults." WPI does not subscribe to any of these services.)

There are also untapped possibilities for interfacing the computer system and the video network.

"Educational" TV Off the Campus

During spring 1972 a course entitled "The Nuclear Power Controversy" was videotaped with a live, participating audience (consisting mostly of high-school teachers). The resulting tapes were edited down to eighteen hours of video and since then have been distributed widely as discussion material. As of this writing nearly forty other schools have requested the use of these tapes. The course was sponsored by the Atomic Energy Commission and the Yankee Atomic Electric Company.

Another course, entitled "Marketing Management," was also videotaped with a live class. This course will be used off-campus as part of WPI's continuing education program. Video now enables WPI to easily offer a course at, for example, an industrial plant in Pennsylvania. The tapes are sent on a weekly basis, and the WPI faculty member who is teaching the course needs only to make a few trips to attend the class in person. This helps keep costs down and it enables the influence of WPI to be spread much farther. Another bonus of videotape is that the material normally can be used over again with only minor revision and updating, and this too frees up faculty time and helps increase the overall efficiency of the instructional process.

Labs and Learning Labs

It's easy to see how videotapes can replace lectures. But laboratories?

Video has, in fact, proved to be a significant addition to the time-honored laboratory approach to science and engineering education. It does not replace, but it most certainly has revolutionized the process.

The lab experience started in early 1970, when enrollment in a control engineering course increased to the point where it was impossible to schedule an analog computer laboratory in the traditional manner. There just wasn't enough time and enough computer capability under the normal time restrictions of 1:00 to 4:00 on Tuesday and Thursday afternoons.

So the mechanical engineering department took a daring step and decided to allow students to use the analog lab whenever they wished, on a twenty-four hour a day basis. Video was brought in as a means of answering the myriad questions that inevitably arise when a student patches a board and operates the computer for the first time. The normal introductory lectures and instruction on the use of the TR-20 computer were still given, but now students could reserve the computer whenever they wished by signing out a key for the laboratory. By careful scheduling of assigned problems, it was possible to accommodate up to 100 students in the one analog lab with only one TR-20 analog computer.

A television viewing station was set up in the lab, and a special videotape was created. A student could review the whole tape before starting an assignment, or he could dive right in and refer to particular sections of the tape to answer specific questions as they arose, because the tape is indexed by subject. Even though instructors were available during normal hours, students were encouraged to use the tape to obtain

Technical Talk

Videotapes produced in the WPI studio are recorded on 1-inch and ½-inch tape simultaneously. The 1-inch tape provides a good quality master which is later used to make multiple ½-inch copies as needed for student use. Usually a ½-inch copy is kept as a file master and the 1-inch tape is reused. Until recently, the only copy in existence was the one being used at the viewing stations. This was done in order to minimize costs.

The standard WPI viewing station consists of a Sony AV-3600 videocorder and a 18-inch monitor. These videocorders are of the reel-to-reel type and have proven to be very reliable in use; maintenance costs have been quite low. Videocassette systems have been explored, but the varying lengths of current productions and the need for new playback equipment have so far mitigated against the cassette.

The television system at WPI is strictly black-and-white, primarily for economic reasons—color recorders and monitors are only marginally more expensive than for b/w, but the cost of decent quality color cameras is out of sight. (Worcester State College, however, has recently opened a color studio on its campus.)

A viewing station costs approximately $900, including necessary wiring. New ½-inch videotape costs less than $20 for a one-hour reel. WPI studio costs normally run about $50 per hour. The total cost, therefore, to make an original 30-minute tape is less than $40, not including faculty preparation time. Duplicate 30-minute tapes cost $15. Most faculty members spend about the same amount of time preparing for a 30-minute tape as they would preparing for a normal lecture.

answers to their questions. The availability of the tapes permitted round-the-clock operation of the laboratory seven days a week. This simultaneously increased the operating efficiency of the computer and improved the quality of the learning experience, because each student was able to spend as much time as he wanted or needed learning to program and operate the analog computer.

This first experiment in using video aids for laboratories was immensely successful. It was also favorably regarded by students. Among other things, the lending of keys seemed to increase the students' feelings of responsibility in using the equipment and helped to reduce maintenance costs. This was the first "hands-on" use of videotape equipment by students, and it quickly spread to other uses in other labs.

Professor Leslie C. Wilbur, who teaches a basic laboratory course in nuclear engineering, normally had to spend many hours detailing the use of the radiation analyzer and other sophisticated radiation-detection devices, either to small groups of students or, often, to individuals. He put his instructions on videotape, and a viewing station was placed in the nuclear laboratory near the instruments. After this, Professor Wilbur was freed from the repetitive drudgery and had more time to devote to personal contact with his students.

The Continuous Lab

Recently the life sciences department instituted a whole new concept in laboratory procedure, the continuous laboratory, in a move designed to optimize student learning efficiency in a laboratory area which was limited both in space and in equipment. For courses in "Biological Science" and "General Physiology," a variety of laboratory exercises were required, but there was only one room with limited facilities available. A video viewing station was established and a number of tapes made, and these were relied on heavily to explain the objectives of each laboratory exercise, detail the operation of the equipment involved, and in some cases show the results expected. This open laboratory now has different students working simultaneously on many different exercises, with a consequent savings in the amount of equipment required (elimination of duplicate setups) and, best of all, no decrease in learning.

As an example of the continuous biology lab in operation, one exercise has students view a videotape detailing the dissection of the frog sciatic nerve and gastrocnemius muscle while they perform their own dissections. The tape also shows the students how to operate the stimulator and oscilloscope used for the display of nerve action potentials.

Before the video-aided continuous lab, the instructors had to spend inordinate amounts of time helping students with routine operations and problems. Now they are available to respond to more specialized and individualized questions from students. Another benefit is that students need to spend less time with difficult experimental procedures and are able to move more rapidly through each experiment.

Project Applications

Increasing importance is being given to project work by students at WPI. One aspect of project administration that has emerged is the need of students to acquire certain skills or areas of knowledge quickly, particularly with regard to measurements and instrumentation. To help out students in this situation, Professor Kenneth Scott has inaugurated PIMELL, a shorter way of saying Project Instrumentation and Measurement Experimental Learning Laboratory.

The first of the PIMELL modular setups deals with the measurement of humidity. Prepared programmed materials guide the student in the use of such instruments as an Alnor Dewpointer, a sling psychrometer, and a hygrometer, while the use and handling of the devices are graphically illustrated on videotape. Once the student has become familiar with the methods available to him to measure humidity, he may choose the method appropriate to his needs and sign out an instrument for project activity. Other PIMELL modules are being established or the measurement of temperature, pressure, flow, and so forth.

Herman Dumas in the control room of the WPI video studio

Responsibility From the Bottom Up

The overriding trend in educational practice today is toward more freedom: freedom in picking the method, the time, the place of learning. To be successful, this freedom must be accompanied by an increase in individual student and faculty responsibility. The heavy use of television and other advanced technological aids at WPI has helped provide students with this new freedom, and it has given them an opportunity to demonstrate increased responsibility. As the focus of activity leans more strongly to project work and the open laboratory format, learning now becomes the constant factor and time and method are variables.

An important factor in the success of the new methods is the support they have received from everyone – students, faculty, and administration. At some colleges, large and expensive television systems have been installed, but they are scarcely used. The reason is that only a few people saw – or see – any worth in those systems. There, considerations and opinions of students and faculty were not an integral part of the planning.

At WPI everything has grown from the bottom up. Faculty saw a need, initiated the use, created the demand; only then was significant investment made in the systems currently being used. Faculty have found new outlets for creative teaching efforts; students have readily accepted the new approaches; all over campus the interest and excitement of learning are accelerating.

Technology, at last, is beginning to pay back some of its debt to the educational process that has nurtured it for so long. □

We are looking over a second grader's shoulder during a reading and spelling lesson. The year is 1980. Tommy, age 7, is seated before a 20-inch color television console equipped with a typewriter keyboard and a lightpen (a device like a small flashlight that can be pointed at the screen to indicate an answer). His instructor's face appears on the screen, cordially greets him and asks his name. After Tommy types it out, the instructor says: "Well, Tommy, are you ready to begin?" The instructor now asks him to spell "smile." Tommy slowly types the letters, which instantly appear on the screen. If he is correct, he is praised and then prompted to spell a harder word, and so the lesson continues. If Tommy was wrong, the instructor will attempt to help Tommy see where he went wrong.

THE FACE ON THE CLASSROOM WALL

by Stephen R. Alpert, '67

During this entire lesson, Tommy will be the only *person* involved. The "instructor" is a computer, which will generate the face on the screen, supply the voice, and guide the lesson throughout. The results of the entire episode will be printed out later for Tommy's "real" teacher (a live human being) to examine and use in gauging Tommy's progress, to point out those areas where Tommy may need extra help or drill.

What makes this a lesson in 1980 rather than one in an advanced classroom today is the face on the screen. It is not a videotaped picture, for that could not be readily adapted to different responses from Tommy. Instead it is an animated face generated by the computer itself. The use of a friendly face (and other types of animation) will, naturally, make Tommy much more excited and eager to interact with his mechanical instructor — a big step over a simple prerecorded audio message.

The Face

The face on the screen is one of the more exciting aspects of the field known as *computer graphics.* Ever since man started to scratch marks onto the wall of a cave, he has constantly searched for more advanced tools to aid him in visually expressing his ideas. In recent years, computers have become an important aid to many artists. In fact, the modern computer and its graphic display possibilities may be the artist's most interesting tool since the advent of oil paints.

What problems must be overcome to produce computer animation of the sort mentioned earlier? The first problem is that of storing the face in digital form in the computer's memory. At this stage of the art, at least, a basic compromise is made. The face is considered as a series of polygons, usually

Stephen R. Alpert, '67, is assistant professor of computer science at WPI.

Figure 1

with a maximum of six sides, attached together just like a spider's web. Such a face is depicted on the cover of this issue.

So far, things are relatively simple. However, when one or more points move, for instance when an eye blinks, these motions exert forces on the entire network of lines and the face must distort in the proper direction and to the degree that a human face does. For each line in the figure, many calculations must be made to determine in which direction every connecting line moves and how far it stretches. Consider: the lines toward the middle of the cheek must be fairly elastic, while those on the forehead are much more rigid. The computer has to take all this into account if the animation is to be realistic. Many millions of calculations and a second or so later, the face appears on the screen transformed to its new position.

The spider's web of lines that we have now does not look like a face, so we next add hair, eyes, eyebrows, a mouth, and lips. At the same time we add a source of light in front of the face and shade the polygons according to their angle relative to the light source (Figure 1). We now have a face that looks three-dimensional, but it has the appearance of being roughly carved from wood. So we apply some computerized sandpaper (a shading algorithm) to smooth off the sharp ridges, and the result is a face with a much more lifelike appearance (Figure 2).

All of these calculations must be done at each step in order to create animation. In practical terms, this means that most computer-generated "movies" are filmed a frame at a time and then speeded up to simulate the actual movement. Because of the time scale involved, only the simplest of pictures can be viewed directly off a computer display screen and still give a sense of life. But with increasing computer speeds and program sophistication, this problem will be eliminated over the next few years.

Anyway, now that we have generated a face that moves, we "simply" add a voice to the face and the computer will talk to us, eye to eye! Computer animation of this type will serve as a prime tool in computer-aided instruction for elementary school children in years to come.

The animation of the face illustrated here was done by Fred Parke at the University of Utah. The face is, in fact, that of his wife, and Parke's young daughter recognized her Mommy on the screen.

← *Figure 2*

Interactive Graphics

Computer graphics have applications for grown-ups, too. Representative of the work being done in many places are two projects developed at Sanders Associates in Nashua, New Hampshire.

The first project is typical of the uses of interactive graphics systems in the command and control situation. Figure 3 shows the geographic boundaries of the various divisions of the Los Angeles Police Department. A dispatcher at a display console can select any given division, and then one-mile-square

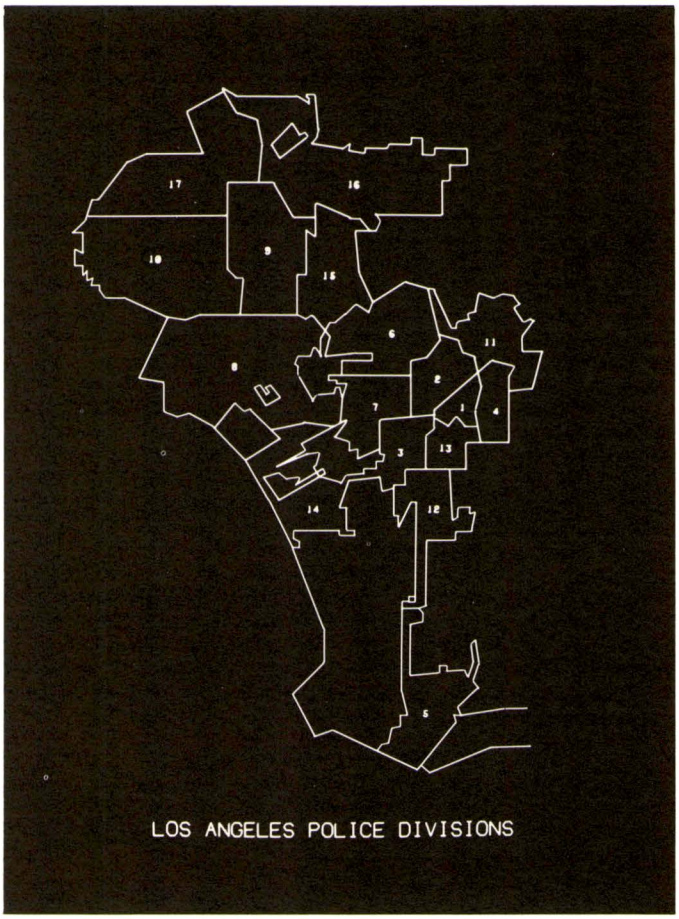


Figure 3

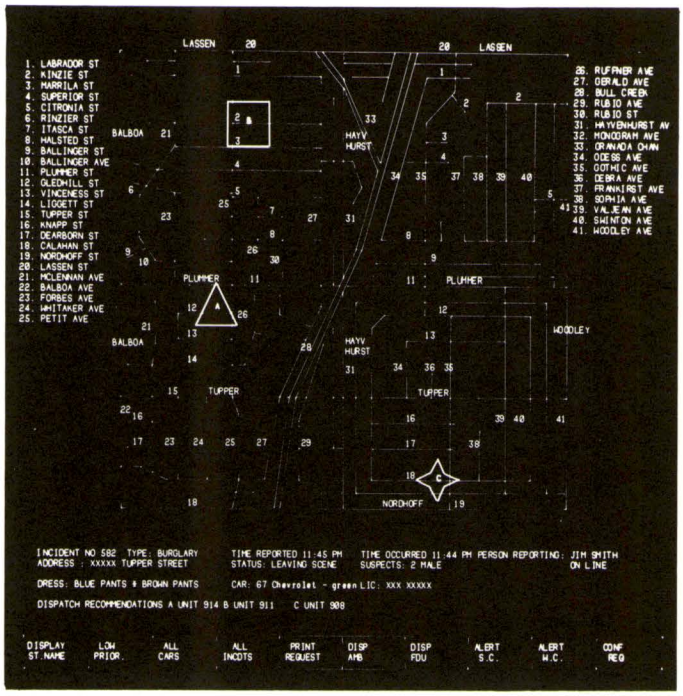
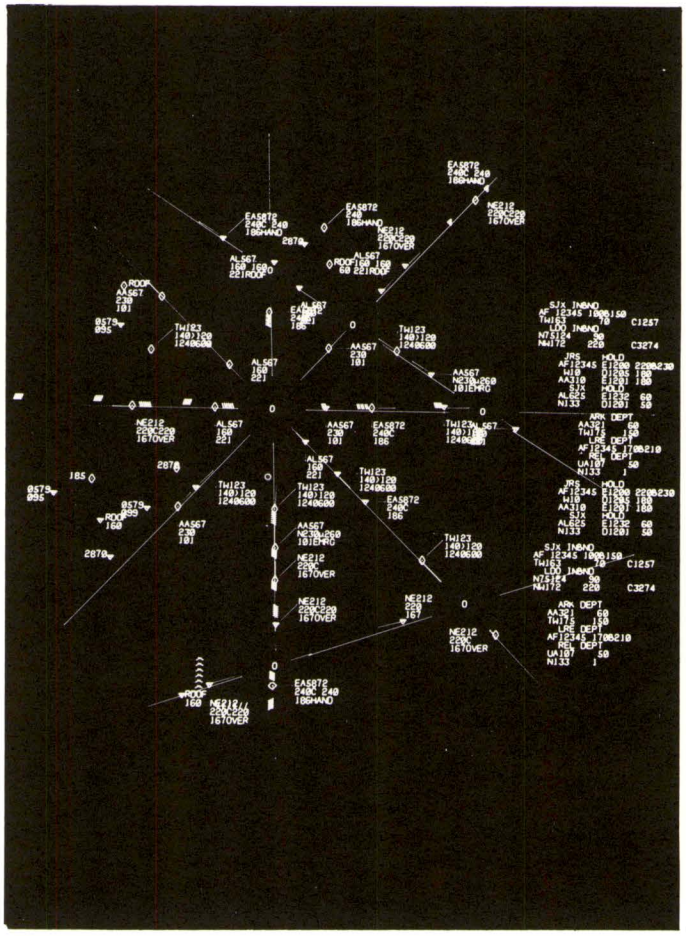


Figure 4

Figure 5



subdivisions for closer inspection. Figure 4 illustrates a detailed street map and incident-reporting format as an emergency vehicle dispatcher would see it. Three different types of vehicles have been highlighted to show their current location. The function boxes at the bottom of the screen are quick-action buttons that will perform a predetermined operation. For example, if the dispatcher selects the **DISP AMB** box, an ambulance will be automatically dispatched to the address reported in the incident-reporting section of the screen.

Another application with many future uses is as a part of computer simulation. Figure 5 shows a typical air traffic control pattern as it would appear on a radar screen. Each data block on the screen represents an aircraft under the direction of a particular air traffic controller. History tracks are indicated as slash lines; up to six of these history lines can be shown at once. The tabular information at the right presents the current situation in text form. With the use of this system, air traffic controllers can be trained under realistic conditions without endangering the lives of air passengers. If a mistake is made here, no real crashes and no disruption of air traffic will result.

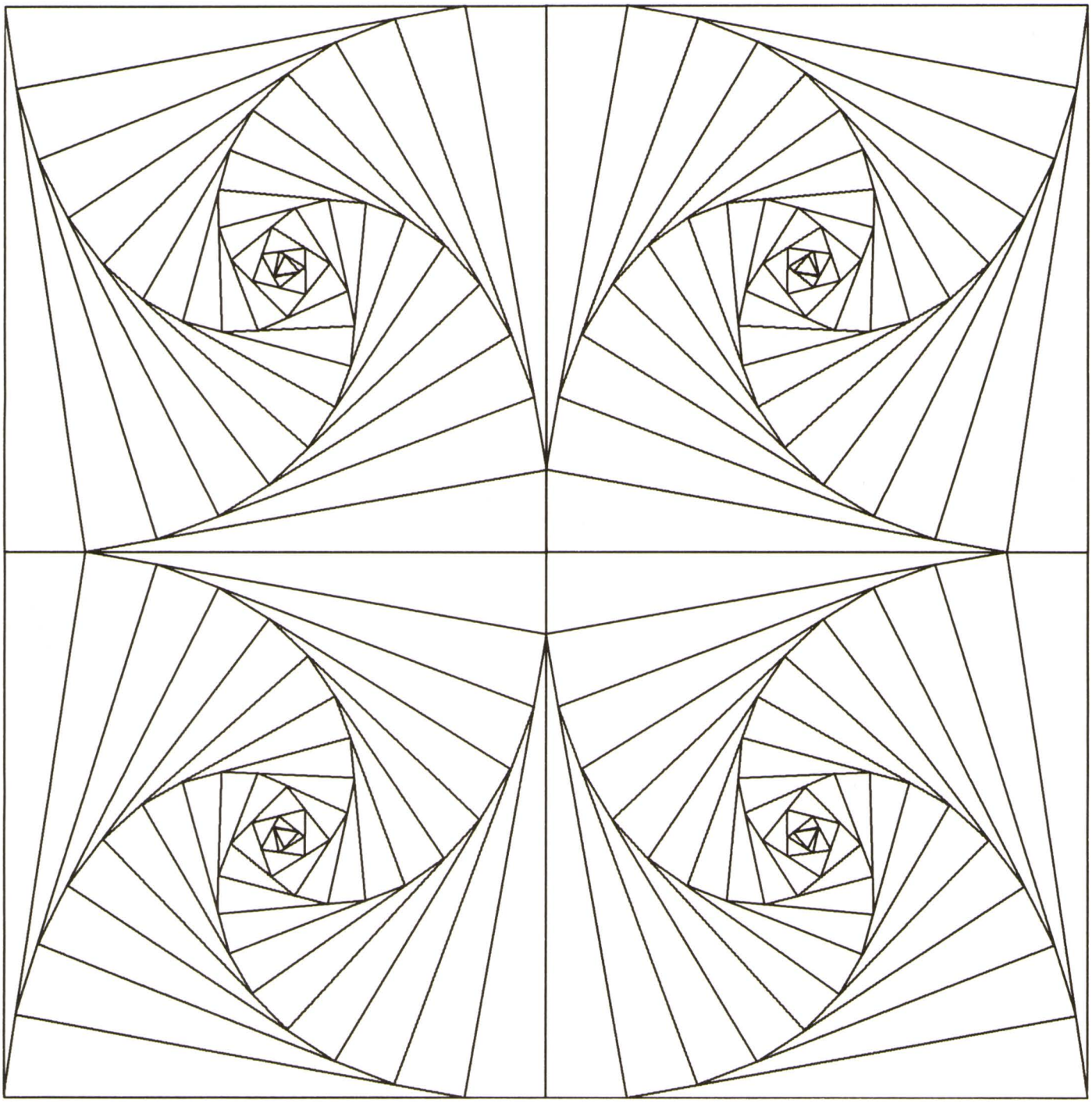


Figure 6

Graphics at WPI

Work is being done at WPI in several fields of study, notably computerized plotting. Stereographic projections can be drawn to give a three-dimensional view of many atomic and molecular structures. Some of the beauty and symmetry of mathematics can be seen in graphs generated by simple equations (Figure 6), which are computer-drawn in a few minutes. A person would require several hours to produce the same picture.

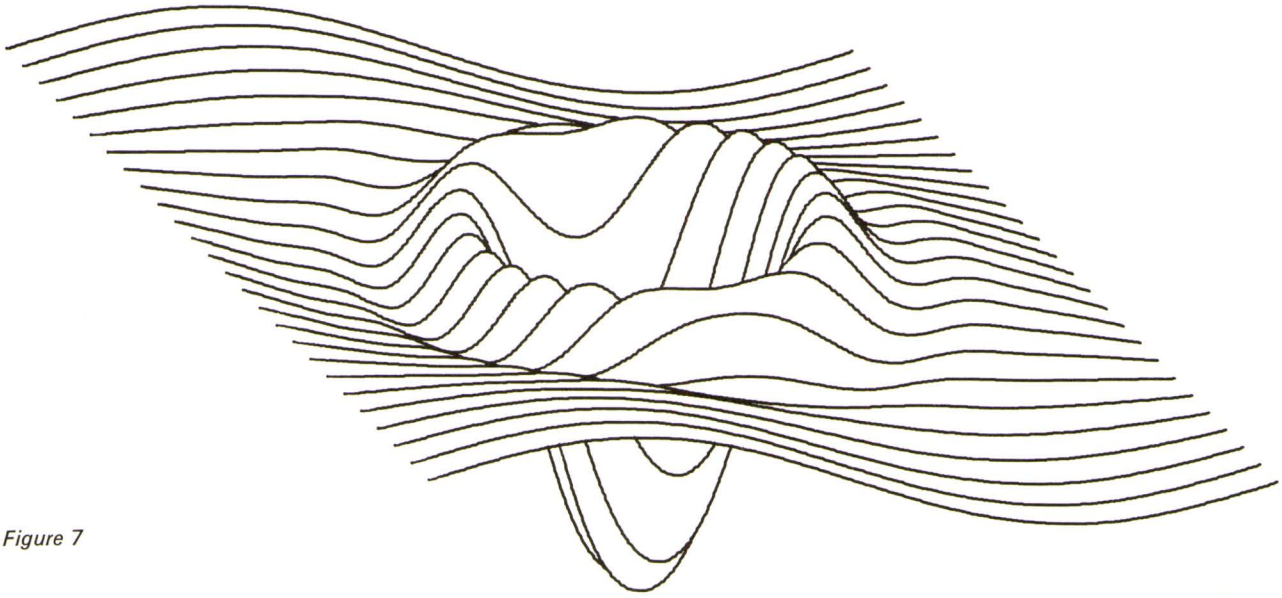


Figure 7

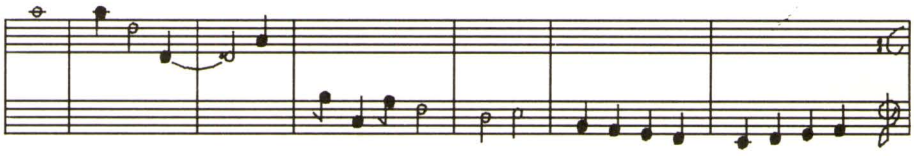


Figure 8

Another technique is called "interrupted line" plotting. This produces perspective drawings of three-dimensional surfaces (Figure 7) with a precision, accuracy, and speed that would make any draftsman jealous – and obsolete.

At the moment, three WPI students are attempting to use the computer to simulate the composition of music. This may sound old-hat, but these students want the computer to go farther than merely typing out the letters of the notes. They want the computer to produce its composition in full musical notation (Figure 8). They have not yet found a volunteer to play their creations.

These are but a few examples of the exciting work being done in computer graphics today. With the cost of computer use and display equipment decreasing rapidly, prospects are bright for even more mind-boggling uses of computer graphics in the future.

Perhaps you remember some of the space-ship scenes from Stanley Kubrick's film, *2001,* where often dozens of display screens would be in front of the astronauts, each screen giving a constantly changing animated display of one sort of data or another. Kubrick faked it for the film, with 16mm movies rear-projected on to each of those screens. But the day is coming when that may be the best way to present a pilot with the split-second information he needs. The technology for that will soon be a reality. □

The Passing of Physics One

With the coming of spring this year at WPI, one of the common memories of generations of WPI graduates has itself passed into the realm of memory. General Physics, the basic course which used to be required of all undergraduates, will no longer be the same because of the departure of the two men who watched over it for those many years. Professor Kurt L. Mayer died suddenly on February 22, stricken with a heart attack while talking with a student in his office. Edwin Anderson, the physics lecture assistant who set up demonstrations and maintained lab equipment for 44 years, retired February 1.

KURT MAYER was not a man easily forgotten. Walter B. Dennen, Jr., '51, spoke with several people about him recently. "When I asked if they remembered him, everyone smiled in fond remembrance. Some could not offer specific comments, but they nevertheless remembered enough to smile."

Mayer was a native of Germany who joined the WPI faculty in 1942. Professor Allan Parker, head of the physics department from 1949 to 1972, talked about Mayer's relationship with his students. "When a student came to him for help, he would give him quite a lot of help. But he wanted the student to learn to think for himself, and Mayer would gradually draw out the student so that he would end up answering his own question.

"He was most concerned with teaching, and with the philosophy of physics. And though he was a philosopher, he had a deep belief in the experimental method. He was really well-liked by his students, as an advisor and a counselor, though in his earlier days at WPI he was best known as a lecturer, the most colorful lecturer at WPI."

Bill Lupoli, '61, reminisced about Mayer's classroom presence. "Professor Mayer would scan the lecture hall, smiling all the while, and suddenly call out your name and ask you a question. I always felt that he was not trying to involve us in his lectures as much as he was attempting to keep us alert. When we entered his classroom or lecture hall, we would find the blackboards filled with his outline and equations. If we spent our time copying the material rather than listening to him, we had to be losers since his tests were always based on what he said. He was a tough man to keep pace with."

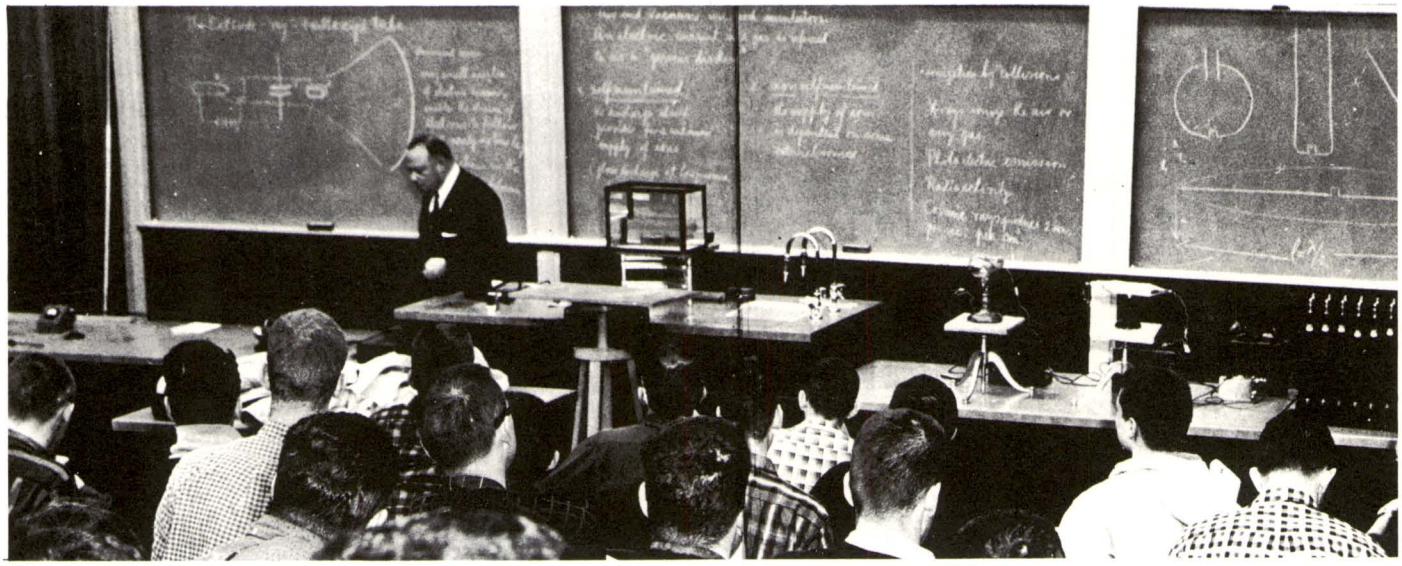
At times, Mayer did seem to have a fearsome reputation among the student body. Vince Pace, '71, commented that "he seemed to enjoy overwhelming the freshmen, keeping us off balance. I'll always picture him entering the classroom with that massive volume of Newton's Laws under his arm. I finally concluded it was just a stage prop, but it sure worked on us."

The Rev. Ed Swanson, '45, has a colorful memory of Mayer's first year at WPI. "I remember vividly and with much appreciation being in one of Dr. Mayer's first physics sections. I was a freshman at WPI, it must have been in the spring of 1942, and he had only recently come to this country. He spoke with a thick German accent which sometimes made us smile, and his syntax left something to be desired. On one occasion, when he caught us smiling at one of his expressions, he said: *'Gentlemen, please do not laugh at me. I have not been in this country yet a long distance.'* That really broke us up. He was a good, kindly man, and I remember him with great fondness."

One of his students, Dr. Robert E. Seamon, '61, now on the staff of the Los Alamos Scientific Laboratory, held Mayer in special regard. He summed up his feelings in this manner:

"Perhaps the principal advantage to be derived from attending a small college like WPI is the opportunity for close contact with members of the faculty, among them tremendous personalities like Kurt L. Mayer, who holds a prized spot in the memories of many whose lives he touched. He was an unforgettable person; no one could have worked or studied with him without realizing his love for physics and the joy and enthusiasm with which he approached his academic responsibilities.

Prof. Mayer at his physics lecture—from the endpapers of the 1960 Peddler



"Professor Mayer was the best teacher under whom I ever studied – a master from the viewpoint of his understanding of good pedagogy. His thoroughness as an instructor provided me with a good foundation in classical physics which was most important to me in graduate school. I believe he was most successful as a teacher because of his realization that one learns best through practice and repetition. He would give us problem set after problem set, most of which he graded himself. How often that little note – *'See me! KLM'* – appeared on his students' papers – just one measure of the hours of time he was willing to spend in personal conference with them. Those who took advantage of all the extra effort he put forth were undoubtedly the beneficiaries.

"We can remember him for many things: his immaculate appearance, his sharp dress, his use of practically every conceivable demonstration in P-3 lectures, his mechanics notes with which he would fill the blackboards on three walls, his pride in having walked to the Institute and arrived promptly on the snowiest of mornings; but most of all his concern for the physical, emotional, and educational well-being of his students. Those who kept in contact after they left the Institute realize how pleased he was to hear from his former students, his pleasure in seeing their names among the authors of scholarly and technical articles, and his joy in receiving reprints of their work. He always would inquire about my classmates by name and be disappointed if I had nothing new to report.

"As far as I am aware, his greatest professional concern in recent years was to maintain Tech's reputation as an outstanding undergraduate institution rather than to compete with the large universities in graduate education. Professor Mayer was convinced that the finest contribution WPI could make to the scientific and engineering communities was to produce college graduates who could be counted on to do well in their careers – to stand among the best.

"Often we fail to tell others how much they have meant to us until suddenly it is too late. I hope Professor Mayer realized that he had a profound influence on my life, for in addition to all that he taught me he urged me into graduate work and helped me find an acceptable and realistic accommodation to interests in physics and music. Besides being grateful, I am proud that I feel able to acknowledge him as having been my friend."

Kurt Mayer's passing was deeply felt on campus. A meeting of faculty and students who knew him decided that the best way to honor his memory, in view of his lifelong dedication to teaching, is to establish a scholarship fund in his name. Alumni who wish to contribute to the fund may do so in care of the University Relations Office at WPI.

WPI's Gadget Man Packs In His Tools

by Ernest Gutierrez

In the aisle of electricity, Edwin Anderson rubbed a thick glass rod with rabbit fur and slowly swept the rod over the back of his hand. "Static electricity," he proclaimed, as the hairs on the back of his hand reached up for the rod.

As a physics lecture assistant, Edwin Anderson has spent 44 years setting up experiments for WPI students to prove the existence of, and to measure, light and sound, heat and cold, electricity and magnetism, and other elemental forces.

He pointed out instruments as though introducing old, reliable friends. Many are no longer used, victims of progress. The shift in WPI curriculum from a structured program to the WPI Plan stressing student initiative, plus a shorter term, have cut down on lectures.

But Anderson remembers years of busier days when his experiments regularly proved basic physics principles. "These things," he gave a sweeping gesture to the shelves crammed with instruments, "were all used for dozens of different experiments. The basics are the same. Some of these instruments really haven't been improved. The basic principles of physics stay the same."

In the beginning, Anderson intended the lecture assistant job to be temporary and hoped to continue his formal education. "But the depression came," he said. "I know the basic principles, but I never got the higher mathematics."

On a middle shelf in an aisle of mixed instruments, Anderson leafed through a dusty pile of barometric pressure charts. He found the one he was looking for – the day of the hurricane of 1938. Next to the charts were a dozen dusty barometers. "We used to have the boys carry them up to Bancroft Tower to measure the difference in barometric pressure as you get higher."

"I collect antiques. Some of these instruments are antiques. Some were old when I came here." He stopped near a big old black projector that took large glass slides. It carried a plate saying it was donated by the Class of 1897 in 1928. On a nearby table Anderson pointed out the modern slide projector used today. The old projector was gathering dust.

Anderson said he will avoid the old projector's fate. After 44 years of the science of physics, Anderson will devote much of his retirement time to photography. "I really enjoy photography. So far, I've been taking mostly color slides."

He said he will be using some of the skills acquired in his work for his own pleasure. "You have to be everything to do this job – an audio man, a carpenter, an electrician."

In the busier days, Anderson preferred to build rather than buy equipment when possible. Two of his amplifiers were being used in a lecture while he was being interviewed. "I built them 15 years ago, and they're still working."

Will he miss the job?

"I suppose I will. I've enjoyed working with the kids. I call them kids, but I probably shouldn't. They're wonderful people."

"I told them I'd come back if they needed help with anything, but not on the first day of retirement. I want to sleep until 9 a.m. for a change."

Reprinted from the *Worcester Evening Gazette* □

Of CATS and COWLS and WITCHES' COVENS

by Ruth Trask

It was Intersession again (described by someone at WPI's "January diversion from normality"), and there were some strange doings on and around the campus. About 165 courses were offered in the catalog, and some 180 were actually given (!) – that's one of the interesting things that happens when no one is compelled to do anything.

A year ago the *WPI Journal* offered a wide-ranging look at the variety of subjects explored. This time we're going to tell you about three courses – courses which might be grouped (quite loosely) under the general heading of religion.

Introduction to Yoga

The heat in the windowless wrestling room at Harrington Auditorium rose to a stifling 80 degrees.

"The atmosphere in here is not exactly conducive to the practice of good yoga," announces Margaret Kranich, co-instructor of the course along with her husband, Dr. Wilmer Kranich, the George C. Gordon Professor of Chemical Engineering and department head at WPI.

"But we'll manage," she continues. "Everybody relax on the mats while we listen to a lecture on Hinduism and Yoga."

Dr. Kranich talks about the concept of Hinduism, reincarnation, and the yoga philosophy. He says that Hindus believe that people are reborn again and again into either higher or lower life forms, and that how one lives his life determines whether he will have a good or bad karma. (According to the Hindu explanation, any apparently undeserved pleasure or pain comes as a result of deeds done in a previous existence.)

He explains that priestly asceticism has been of prime importance in India. Cutting onself off from the endless wheel of life, death, and rebirth in order to be at one with the universal spirit becomes the be-all and end-all of a Hindu yogi's existence. Some yoga practitioners are able to meditate unceasingly for days, weeks, even years at a time.

Yogi ascetics live alone and exercise complete control over their minds and bodies. They have no valuable earthly possessions, believing that desire is the key to evil. In order to meditate undisturbed they find a firm place to sit and concentrate. Assuming the cross-legged lotus position with head, neck, and spine erect and vision indrawn, a yogi transports himself to ultimate peace.

Dr. Kranich's talk is over. The students who are lying down sit up on the floor mats. The seated students stretch out their legs and shake them.

Mrs. Kranich tells the class to stand up and get ready for yoga exercises, warning everyone not to push too hard. After a number of stretching exercises and a series of knee-stretching bends, she feels that the students are ready for the plough position.

The young yoga enthusiasts lie on their backs and pull their feet up over their heads with legs straight. About eight of the twenty-five present manage to touch their toes to the floor.

"Not bad," comments Mrs. Kranich. "Now do the fish."

The students, still on their backs, arch up their chests and rest the tops of their heads on the floor.

"A good lung stretcher," observes the instructor, who takes time out to teach the class yoga breathing.

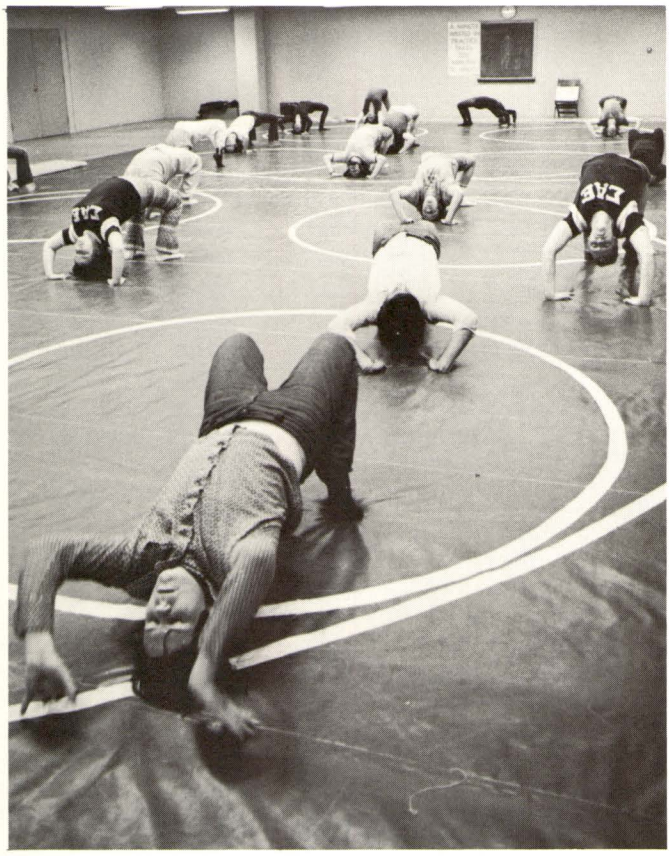
"Don't breath too deeply or too long," she cautions. "There's a danger that you can become super oxygenated and take off on a trip that you don't expect."

After the breathing exercises she has everyone writhing in

a frontal position mimicking cobras. When the "cobras" turn into "cats" the exercise period is over.

Perspiration drips off the participants, but no one is complaining of the heat or sore muscles. In fact, most feel in tip-top condition, their limbs limbered, mental cobwebs removed, and their spines made more supple.

Mrs. Kranich tells them, "You are as young as your spine." Looking at the lithe and lively instructors (who, incidentally, stand on their heads each evening), the class has to agree.



St. Joseph's Abbey

Monks are "holier than thou." Monks have no sense of humor. Monks are an anachronism in this age of men on the moon.

Right?

Wrong! At least at St. Joseph's Abbey, a Christian monastic commune in Spencer, Mass.

Brother Basil (the Reverend M. Basil Pennington), garbed in a long white robe, black tunic, and hooded bench-warmer jacket, greeted Prof. Donald Johnson's Intersession group in front of the abbey church.

He smiled, even though the students were a few minutes late. (Their very large bus had become unexpectedly trapped inside a very small walled courtyard, but an expert bus driver eventually jockeyed it out.)

"Welcome to St. Joseph's," said Brother Basil. "You're just in time for the guitar service."

He ushered the group into a semienclosed section of the church where the astonishingly modern and beautiful guitar service could be heard but not seen. The singing and playing lasted about fifteen minutes during which time the class could appreciate the handsome stone architecture and stained glass windows which were visible over the top of the barrier wall.

Following the service the women were gently but firmly segregated from the men.

"I'm sorry," Brother Basil explained, "but the ladies will have to go with Brother Raphael while the men are shown through the main parts of the cloister and the abbey."

When asked why, he answered: "Because women aren't prospective monks."

So Brother Raphael led his flock to a charmingly paneled room where he told them about communal living as experienced at the Trappist community. He explained that a monk's day starts at 3:15 a.m. and ends at 8:00 p.m. Worship services, private meditation, and prayer are interspersed with periods of work and silence.

Work could be teaching scripture, making vestments and jams, or doing maintenance jobs.

He smiled. "Sometimes we do things that are not quite up to our potential," he said. "For instance for several years one of the brothers, who was a well-known artist outside, worked as a bricklayer when he joined the order. We needed bricklayers more than artists at the time."

Hoping not to give the wrong impression, he explained further. "We usually do find a niche where our talents fit in best. And we are not poured into a strict mold. Religiously speaking, for example, we range from the far left to the far right."

"Where do most of the monks come from?" he was asked.

"From the city," he replied. "The median age of the brothers is 38 and we have a waiting list. Actually," he continued, "a widower usually finds that he can adapt more readily to our way of life. He has already learned how to live with others."

Brother Raphael went on to say that the brothers were allowed to visit their homes if their parents were ill and could not travel to visit them at the abbey. Sometimes travel was allowed for study or to aid in the construction of a new abbey.

It was time to meet the men for a slide show which was to be presented by Brother Gerald. Along the way Brother Raphael asked, "What do you suppose this stone structure is?"

"It looks like a high well," a girl replied.

"It was a windmill once," he said. "We had a meeting and everyone thought that it would be a great place to put pigeons. For three days everyone thought that. Then somebody remembered what pigeons do. . . "

The visit to St. Joseph's was nearly over. But the students couldn't leave without a stop at the abbey gift shop. There they stocked up on the sinfully rich jam and fudge whipped up by the brothers during their work periods.

With each purchase the monk at the cash register gave a gift in return. He said, "God bless you."

Continued overleaf







"That Old Black Magic. . . "

Who lives in a black house in the woods, has a tombstone in the yard, and a skull inside the house?

If you guessed a witch, you'd be right. But if you thought it was a lady witch, you were wrong.

This witch is blond, has a pierced ear, deep blue eyes, and his name is Ted Rabouin. Although he's billed as the Warlock of Westboro (Mass.), he prefers to be called a male witch rather than a warlock. He admits to being the head of the witches' cult in New England.

As one of the speakers in Prof. Thomas Keil's witchcraft class, he fascinated his audience with tales of his psychic abilities, his use of tarot cards in telling fortunes, and his unusual home life.

He explained that electricity interferes with his natural powers so he does all his clairvoyant work and readings by candlelight. Mostly women and young people seek his services.

Rabouin loves cats and has a house full of them.

"Not because I'm a witch," he says. "I just like to have them around."

His real affection for cats is one reason he refuses to participate in black magic, because this type of witchcraft requires the sacrificing of animals. He is, in fact, a staunch supporter of the Antivivisection Society.

He also has strong feelings about conveying his authenticity as a witch. Known nationally, he has appeared on the David Frost television show and has met with a number of experts in psychic circles.

Another local witch, Ron Parshley of Worcester radio station WAAB, spoke about witchcraft as a religion. He believes that it frees a person's mind and offers him limitless opportunity. Ritual magic, he says, is the manipulation of energy and can be done by anyone. A witch, however, must do the more formal ceremonies.

According to Parshley, harmony is the main purpose of the practice of witchcraft. It can help heal an ill person or boost someone up the ladder of success. This process is called white magic and is one of the positive facets of witchcraft.

"I suppose you've heard about the nudity and orgies that take place at our ceremonies," he said. "The only reason for the nudity," he explained, "is to help each member of the coven receive increased psychic energy. Clothes get in the way by interrupting the energy process. I'm not saying that there is no sex at our meetings. After all witchcraft is based on the concept of fertility. But when there is sex, it is responsible."

He laughed. "If you still have inhibitions, you can always join a cult that wears bathing suits during the ceremonies. That's the thing about wicca (witchcraft). You can do almost anything you want."

Mrs. Enid Hoffman, from the University of Connecticut, told a remarkable story of how she exorcised a bad spirit from a bookcase wall in a student's apartment. The ghost had the gall to follow Mrs. Hoffman home, gaze at her during her bath, and glower at her from her bedside.

She finally tired of this ritual and confronted her unwelcome female guest, psychically, face to face.

"O.K., ghost, I'm stronger than you are," she said. "I'm compassionate. You are not. You are evil. Leave this place. Go where you belong. You don't belong here."

The ghost, seemingly hesitant for a moment, was reported to have said, "I'm sorry." Then she vanished and was never heard from again.

"Exorcism is only a minor part of witchcraft and magic," Mrs. Hoffman explained. "Actually some of the greatest practitioners of magic are the *kabunas* or Hawaiian medicine men. Many are said to be able to change the weather and talk with departed spirits who live again in other forms."

She warned of the psychic vampires among us. She said that this type of vampire is full of expressed or unexpressed self-pity. Such a person drains psychic energy from everyone he encounters, leaving his victims mentally and physically exhausted.

Mrs. Hoffman noted a number of psychic methods that can result in healing. One is a mind control method in which people are trained to become more psychically aware. Migraine headaches have reportedly been cured through this process. In another method, subjects or patients are taught to control any bodily function, including their heartbeat, so that severe heart attacks can be automatically averted.

The class was interested in the theory of reincarnation. Mrs. Hoffman, who is quite convinced in the validity of this theory herself, gave the students a quick awareness technique for mind regression, one that nearly always works.

So if a WPI student suddenly roars like a lion or talks like William the Conqueror, don't blame Aztec Gold or John Barleycorn. And don't call Worcester State Hospital. He is probably just discovering who he *was*. . . . □

Completed Careers

MRS. SELMA S. JEPPSON

Mrs. Selma S. Jeppson, widow of George N. Jeppson, '97, former president and chairman of the board of Norton Co., Worcester, died in January. In 1941 the Jeppsons presented their home at One Drury Lane to WPI. It is now the official residence of WPI's president.

JARVIS WILLIAMS, '07

Jarvis Williams passed away on January 13, 1973 following a very long illness.

He was born in Foxboro, Mass., on March 18, 1884. He received his BS in mechanical engineering from WPI in 1907. After serving a number of years as president of Standard Cap & Seal Corp., New York City, he retired and became a consulting engineer.

He was a member of Phi Sigma Kappa Fraternity.

G. ALLAN KING, '11

G. Allan King of Pompton Plains, N.J., passed away on January 19, 1973.

He was a native of Washington, D.C. In 1911 he received his BS in electrical engineering from WPI.

In 1954 he retired from Western Electric Co., Kearny, N.J., where he had been a plant inspector since 1936. Earlier he had been associated with U.S. Resettlement Administration in Pennsylvania; Consolidated Gas Co., New York; and United Engineers & Constructors.

Mr. King was a life member of the Telephone Pioneers of America and the American Institute of Electrical Engineers. He was a member of Tau Beta Pi and also had served as vice president of the Northern New Jersey chapter of the Alumni Association.

He was the brother of Howard P. King, '12.

HOWARD S. MARTIN, '14

Howard S. Martin died January 5, 1973 in Worcester. He was 82.

For many years he worked as a mechanical engineer at Norton Co. and Morgan Construction in Worcester.

A Worcester native, he was a 50-year member of Montacute Lodge of Masons and a past master of all levels of the Scottish Rite of Masons. He also belonged to the American Legion.

During World War I he was with the 29th Engineers at Fort Meyers, Va., and served with them for a year in France.

ELLERY E. ROYAL, '16

Ellery E. Royal, 78, former superintendent of the Belmont Home in Worcester, died January 18, 1973 in Sarasota, Florida.

He was born in Harvard, Mass. After graduating as a mechanical engineer, he worked for Reed & Prince Mfg. Co.; became president of U.S. Screw & Stamping Co.; and later became affiliated with the City of Worcester from 1932 until 1968.

He devised mechanical equipment used by patients at the Belmont Home and was responsible for the transfer from the Home Farm to Belmont Home.

Mr. Royal was a World War I Army veteran and served with the Ordnance Corps. He was a member of Phi Sigma Kappa and a former member of the Alumni Council.

CLAYTON T. PIERCE, '20

Clayton T. Pierce, 77, passed away December 25, 1972 in Massachusetts.

He was born in Dalton, Mass., on Sept. 28, 1895 and later studied at WPI where he was a member of Phi Sigma Kappa Fraternity.

Prior to his retirement he was a self-employed insurance agent in Dalton.

ALFRED H. WESSLEN, '24

Alfred H. Wesslen, 71, a retired industrial engineer, died January 19, 1973 in Worcester.

At his retirement party, held in 1966, he was feted by the Ware Knitters 25-year Club as being the first employee on the payroll when the firm was founded in 1938.

A Worcester native, he graduated as a mechanical engineer from WPI in 1924. He worked for Crompton & Knowles; Gilbert & Barker Co., West Springfield; U.S. Finishing Co., Pawtucket, R.I.; American Woolen Co., Lawrence; Ware Valley Manufacturing Co., and E-Z Mills, Bennington, Vt., before joining Ware (Mass.) Knitters, Inc., as a consulting engineer.

He was a member of the Republican Town Committee in West Brookfield.

BURTON E. KELLEY, '27

Burton E. Kelley, president of CBF Systems, Inc., Covina, Calif., died on January 4, 1973. He was 67.

Mr. Kelley was born in Springfield, Mass., and later studied at WPI where he was a member of Phi Gamma Delta. Prior to his latest position, he had been associated with Commonwealth Management Consultants; U.S. Plywood-Champion Papers, Inc.; Ebasco Services, Inc.; and Best Foods, Inc.; all of New York City.

He was past president of the American Society of Insurance Management, Inc., and served as an insurance lecturer at eight universities. He also held the chairmanship of the American Management Association Insurance Division of Conferences and Seminars.

CLARE S. RILEY, '28

Clare S. Riley, 67, former manager of district sales with Hartford Empire, now Emhart Corp., Bloomfield, Conn., died January 6, 1973 in Clearwater, Florida.

He was born in Northampton, Mass. and later studied at WPI. During his career he was director of purchases for Metro Glass Bottle Division of National Dairies until his retirement in 1970.

Mr. Riley was a member of Alpha Tau Omega.

DONALD C. CONVERSE, '31

Donald C. Converse, 64, died on January 3 in Hyannis, Massachusetts following a long illness.

He was born in Bridgeport, Conn. After studying at WPI and MIT, he was employed at Builders Iron Foundry in Providence, R.I., and later in Philadelphia.

He then moved to Hyannis where he worked for the Colonial Candle Company. During his lifetime he also owned and operated a gift shop in Hyannis and a restaurant in South Yarmouth; founded the West End Businessmen's Association of Hyannis; operated his own construction business; and was employed as a mechanical engineer at Cape Cod Hospital.

Mr. Converse was a member of Sigma Alpha Epsilon Fraternity and a past president of the Hyannis Rotary Club.

CLINTON E. LEECH, '36

Clinton E. Leech of Summit, New Jersey recently passed away.

A mechanical engineering graduate, he was born in Springfield, Mass. on May 27, 1914. At WPI he was a member of Sigma Phi Epsilon, Tau Beta Pi, and Skull.

For many years he was with the Public Service Electric & Gas Co., Newark, N.J., where he was a planning and consulting engineer.

He was a member of the American Gas Association, the New Jersey Gas Association, and the Society of Gas Operators, New York City.

PAUL M. RUSSO, '71

Paul M. Russo, 23, died on January 1, 1973 in Thorndike, Massachusetts.

He was born in Palmer. In 1971 he received his BS in civil engineering from WPI where he was a member of Phi Kappa Theta Fraternity.

He was a member of the American Society of Civil Engineers and was employed by Tighe & Bond, Inc., Holyoke, Mass.

Your Class and Others

1907

Married: L. HERBERT CARTER and Mrs. Helen Rollins on January 7, 1973 in Menlo Park, Calif.

1910

CHARLES E. BARNEY writes that he received a lot of news concerning his classmates over the Christmas holidays for which he was most grateful. From Mrs. WILLIAM R. BELL he learned that her husband is ill and cannot write personally. She says that they fly to Paxton and Holden in the summer and spend winters in their "ideal" location in Sarasota, Fla. . . . ALVAN L. GROUT of Largo, Fla., who was the only 1910 man at the '71 reunion, hopes to see more at the 65th. He writes that he hasn't seen snow for years. . . . EDWARD A. HANFF and his wife, Tex, of Pittsburgh, are both well and enjoying retirement. . . . FRED L. HEWES of Old Bridge, N.J., poses the question, "Would you like to go around again? I wonder." Recently he saw CARL ATHERTON at the Kimball Towers in Springfield, Mass. Carl is alone but "philosophical." Fred also visited the Barneys in South Hadley. . . . LEONARD W. HOWELL, Eastham, Mass., retired from the insurance business last May and now lives with his daughter on the Cape. . . . OLIVER O. JACOBS is enjoying life and looking forward to the 65th class reunion. . . . IRVING L. PETERS summers on the Cape. His four children are college graduates, as are five of his ten grandchildren to date. . . . DANIEL H. REAMY of Fort Myers is enjoying life in Florida. He writes that he has twice traveled the world both east and west. . . . PAUL E. TWISS, Orlando, Fla., still drives on short shopping trips. He and his wife celebrated their 55th wedding anniversary last September. . . . MILLARD CLEMENT is "trying not to give up to old age." Mr. Barney says, "The same goes for the Charles Barneys in South Hadley."

1923

FREDERICK H. SCHEER, the former supervisor, engineering technical services, Westinghouse Electric Co., Metuchen, N.J., has retired.

1925

HARRY G. STANGE has retired from Public Service Electric & Gas in New Jersey.

1927

ROBERT L. PARKER writes that he is recovering nicely from a twenty-foot fall from the roof of a barn he was repairing. Injuries included a fractured hip and four pelvic fractures. He expects to resume his consulting work in Boston soon.

1928

FRANK E. BUXTON has retired from his duties with New England Power Service Co., Westboro, Mass. . . . ANDREW G. TOUSSAINT has also retired. He was with Transport Equipment Co., South Norwalk, Conn.

1929

DIRAN DERANIAN is retired. He was with Heald Machine Co., Worcester.

1930

THEODORE W. JONES has retired after forty-four years of service with the New Haven (Conn.) Trap Rock Company, where he was vice president for administration. During his career he designed a stone crusher and worked as a safety, materials, and blasting engineer. Later he became production manager and construction services vice president. . . . PAUL E. REYNOLDS has retired from Civil Service, Edgewood Arsenal, Md. He is a retired lieutenant colonel, U.S. Army Reserve, Chemical Corps.

1932

ELLIS R. SPAULDING is branch head for Calspan Corp., Buffalo, N.Y.

1933

HENRY C. ASHLEY has retired as manager, applications engineering, Chase Brass & Copper Co., Cleveland, Ohio. . . . City Engineer EUGENE TEIR of Gardner, Mass., is now retired after 31 years of service. He plans to do some free-lance engineering for private firms.

1934

J. LEONARD BURNETT is product manager at Contempo Company, Cambridge, Mass. . . . CHARLES S. FRARY, JR., is now with American Biltrite Rubber Co.

1935

C. MARSHALL DANN, chief patent counsel for the du Pont Company, is the new president of the American Patent Law Association. . . . WALTER B. EKLUND owns and operates Eklund Associates, Wilbraham, Mass.

Retiring early from a lifetime of professional engineering with the government, LADISLAUS T. JODAITIS has shifted to his parallel avocation to complete a book outlining his breakthroughs concerning the

prehistoric evolution of languages. Circumventing taboos and comparative linguistics, his primary research data were the expressions of natural science (in its broadest sense) which persist in words of living languages composed in prehistoric times. Jodaitis resides in Milton, Mass.

1938

FREDERICK J. BURG, vice president of product planning for Salton, Inc., New York City, was the idea man behind Salton's popular egg cooker, bun warmer, and the recently introduced pizza keeper and yogurt maker. According to a recent issue of *Appliance Manufacturer,* Fred has been awarded six patents on product components and another on the egg cooker design since he started out with Salton 13 years ago. . . . HENRY M. RITZ was recently honored at a dinner marking his 35 years as president of R & R Plumbing Supply Corp., Worcester.

FRANCIS L. WITKEGE has retired as deputy assistant chief topographic engineer for plans and programs development with the U.S. Geological Survey. Upon retirement he received a special achievement award in recognition of his contributions as an engineer-administrator in the field of topographic mapping. Previously he was presented the meritorious service award of the Department of Interior. He was also granted a life membership in the American Congress on Surveying and Mapping. Frank and his wife, Lorraine, are looking forward to trailering throughout the U.S., Canada, and Mexico.

1939

After 26 years of service with the AEC and Brookhaven National Laboratory, JOHN H. LANCASTER has left to become project manager and assistant director of the $76 million VLA (Very Large Array) radio telescope project slated to be constructed in New Mexico. He joined Brookhaven in 1946 as chief of the engineering and construction branch in the area. Later he became administrative officer of the $30 million Alternating Gradient Synchotron Project and was also in charge of the $48 million AGS Conversion Project. Currently he is employed by the National Radio Astronomy Observatory.

1940

BRUCE BOYD, who was a fellow engineer at Westinghouse Electric Corp., Baltimore, Md., retired in March. . . . LEONARD GOLDSMITH currently serves as program manager at Singer-Kearfott Division, Wayne, N.J. . . . KENNETH H. McCLURE works for K. H. McClure & Co., Inc., Stamford, Conn., where he is chairman. . . . SUMNER MEISELMAN is with the national headquarters of the American Automobile Association in Washington, D.C. . . . ROBERT B. NEWTON currently is employed by Westinghouse Electric Corp., Madison, Pa.

1941

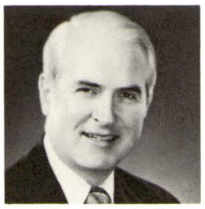
NORMAN G. KLAUCKE has retired as manager of manufacturing and engineering at Acme Chain Division of North American Rockwell, Holyoke, Mass. Currently he is living on the Cape where he plans to pursue his hobbies in real estate and commercial fishing. . . . HILLIARD W. PAIGE, president of General Dynamics Corporation, was the featured speaker at the annual meeting of the South Shore Chamber of Commerce in Braintree, Mass. . . . WILLIAM F. PAULSEN has been made an engineering fellow at E. I. du Pont de Nemours Co., Wilmington, Del.

1943

JAMES H. PARLIMAN and his family have realized a dream—they have moved to Woodstock, Vt., and purchased their own craft and hobby shop, "The Whippletree." Recently Jim resigned from Booz, Allen & Hamilton as an associate research director.

Baharian, '44

Freese, '46



Gorman, '46

1944

ROY E. BAHARIAN has been elected corporate vice president in charge of engineering and purchasing, Diamond International Corporation, and will be headquartered in Stamford, Conn. In 1956 he joined Diamond as a project engineer. In 1963 he became assistant director of manufacturing for the New York Division. Later he was a manager, Woodenware Division in Stamford. Last year he was appointed chief engineer for research and engineering for Diamond International. . . . ALAN C. GAULT has retired from his duties as a U.S. Navy captain with the Civil Engineer Corps. . . . GEORGE D. WILLIAMS recently joined New England Gas & Electric Association, Cambridge, Mass.

1945

ANSON C. FYLER has been named honorary chairman of the 1973 Greater Hartford (Conn.) Open Golf Tournament, Aug. 31 through Sept. 3. He is chairman of the board and president of Arrow-Hart, Inc., and a WPI trustee. . . . JOSEPH F. TIVNAN, JR., is with Paper Trading Corp. of Worcester.

1946

PAUL V. FREESE has been appointed vice president of the Washington, D.C. office of Camp Dresser & McKee, Inc., environmental consulting engineers. Recently he was director of the Washington Water Resources Management Administration, which is responsible for water and wastewater control in the nation's capital. In his new post he will be working on his firm's municipal engineering in the area, in addition to responsibilities in connection with CDM federal and international projects. In 1958 Freese received the National Capital Award as the outstanding young engineer of the year.

PAUL F. GORMAN has been elected vice president-power (Boston) and general manager of the Boston office of United

Where Are You??

With the current roster of WPI alumni at around 10,300, it's probably inevitable that we can't keep track of them all. There are some 300 or so alumni whose whereabouts we don't know, and this means that we can't send them the *WPI Journal* or *WPI Newsbriefs.* The list on this page represents about half the people we've lost touch with. If you can give us information to help locate any of them, we would be most grateful. (The second half of the list will run in the August issue.)

James H. Clancy	1890
Frederic H. Leland	1895
Robert H. Taylor	1895
Edward L. Cullen	1896
Charles V. Walter	1896
Edward G. Beckwith	1897
Roy G. Lewis	1900
Harry W. F. Dunklee	1901
Winfred M. Adams	1902
Chester A. Bacon	1903
Herbert W. Tufts	1903
Elipidio De L. Werneck	1903
Manuel G. Rosado	1905
Ralph S. Forsstedt	1906
Walter P. Ingham	1906
George G. Whitney	1907
Elliott A. Allen	1908
Gilbert C. Lamb	1908
James G. Goodell	1910
Stephen M. Poutier	1910
James F. Thompson	1910
Ralph H. Bowers	1911
Martin H. Jachens	1911
Arvid I. Perterson	1911
William I. Randall	1911
Royal B. Libby	1912
Robert W. Mungall	1912
Franklin Wyman	1912
Stanley M. Gunn	1913
Charles O. Snow	1913
Edward H. Vance	1913
Harry D. Stephens	1914
Arthur L. Thurston	1914
Thomas W. Farnsworth	1916
Gilbert M. Ireland	1916
Joaquim De R. Junqueira	1916
Raymond H. Page	1916
Fred B. Carlisle	1917
Herbert C. Kelly	1917
Walter I. Stearns	1917
Edward L. Anton	1918
Frank J. Murphy	1918
Conant L. Starr	1919
Hobart A. Whitney	1919
George A. Bijur	1921
Forest M. Douglass, Jr.	1921
Milton W. Graff	1921
Joseph F. Scanlan	1921
Joseph T. Fanning	1922
Francis W. Harney	1922
Charles E. Martin	1922
Edward J. Witt	1922
Willard A. Gallotte	1924
Richard F. Whitcomb	1924
Kenneth G. Broman	1925
Tzu-Hzu Chou	1925
Charles E. Crang	1925
John J. Hynes	1925
Thomas F. Plummer	1925
Charles F. Stevens	1925
George C. Chow	1927
Yat W. Chow	1927
Ronald E. Jones	1927
Maxwell L. Stoughton	1927
Donald S. Bliss	1928
Gordon N. McColley	1928
Leo J. Melican	1928
Alvar O. Ericson	1930
Edward T. Fox, Jr.	1930
Francis O. Carlstrom	1931
Lewis S. Haskins	1931
James McWhirter, Jr.	1931
Arthur B. Brainerd, Jr.	1932
Edward F. Donohue	1932
Eino O. Leppanen	1932
George E. Oman	1932
Chester A. Werme	1932
Ellis R. Brown	1933
Stephen S. Haynes	1933
Thomas A. Hyde, Jr.	1933
Wright H. Manvel	1933
Thomas F. McLoughlin	1933
John J. Molloy, Jr.	1933
Charles H. Newsome	1933
William A. Michalek	1934
Raymond G. Desrochers	1935
Alvaro A. Silva	1935
Louis D. Soloway	1935
Edward Tavidian	1935
Russell H. Wood	1935
William F. Atwood, Jr.	1936
Thomas J. Healey, Jr.	1936
William Miseveth	1936
Jacob A. Sacks	1936
John H. Chapman	1937
Frank Ellsworth	1937
Iver T. Rosenlund	1937
Arthur A. Davis	1938
Russell Jennings	1938
Thomas E. O'Neil	1938
Irving W. Forde	1939
Laurence M. Howarth	1939
Fred J. Kraemer, Jr.	1939
William F. Payne	1939
Raymond B. Piper	1939
Charles S. Stevens	1939
Dr. Ronald S. Brand	1940
Lennart Brune	1940
Robert J. Cannon	1940
Jeremie Lafrance, Jr.	1940
Judson D. Lowd	1940
Joseph J. Platukis	1940
Bernard Polonsky	1940
Joseph C. Putelis	1940
Harry E. Stirling	1940
Alfred F. Andersen	1941
Burgess P. Brownson	1941
Lyle W. Carpenter	1941
Jerome E. Schread	1941
Chamroon Tishyanandana	1941
Frederick J. Bargiel	1942
Morris C. Chu	1942
David L. Hartwell	1942
Kenneth T. Hunt	1942
John M. Townsend, Jr.	1942
John J. Tyner	1942
William S. Allan, Jr.	1943
George Cagen	1943
Everett W. Dunlap	1943
Reed C. Fulton	1943
Herbert W. Hope, Jr.	1943
Clifford B. Moller	1943
Harold E. O'Malley	1943
Marshall B. Raybin	1943
Dr. George P. Scott	1943
Louis J. Baldini	1944
Richard T. Brown	1944
Dr. Daniel Koval	1944
Harold A. Krieger	1944
Peter E. Talley	1944
David M. Trotsky	1944
Donald M. Campbell	1945
Cmdr. Kenneth B. Hofstra	1945
Clifford E. Lanigan	1945
Leonard F. Moore	1945
James Taylor III	1945
Alvi T. Twing, Jr.	1945
Richard T. Walsh	1945
Bernard L. Beisecker, Jr.	1946
Irwin G. Benkert	1946
Gaetano Biuso	1946
John M. Considine	1946
Anthony L. Daoundakis	1946
Wilton A. Ericson	1946
Robert N. Gregoroff	1946
Walter H. Hatch	1946
Christopher A. Herbert	1946
William M. Hovenesian	1946
William J. Kelly	1946
Dr. Myer Krulfeld	1946
John J. Landers	1946
Alan Y. Levine	1946
Philip R. Loshin	1946
Dr. Karl M. Mayer	1946
Howard F. McCormick, Jr.	1946
Allan W. McCoy	1946
Peter M. McKinley	1946
Elton K. Morice, Jr.	1946
A. Lewis Rogers, Jr.	1946
Alvin M. Ross	1946
Sidney S. Sperling	1946
Edward Stokel	1946
Miczyslaw J. Waclawek	1946
Jack Wexler	1946
Maurice I. Young	1946
Jose R. Biamon	1947
August L. Flotteron, Jr.	1947
Roland H. Guay	1947
Ernest E. Kimball	1947
William Longmuir	1947
Vaikunth C. Thakar	1947
Benjamin B. Barker, Jr.	1948
David I. Caplan	1948
Neil H. Gebhardt	1948
Charles A. Heyelman	1948
Julian H. Jacobs	1948
Birger D. Lund, Jr.	1948
Paul J. Martin	1948
Ronald A. Moltenbrey	1948
William R. Olha	1948
Shou L. Pan	1948
Frederick R. Paul	1948
Leonard D. Rood	1948
Kenneth E. Whatmore	1948
Thomas H. Wyllie, Jr.	1948
Kinsley A. Ball, Jr.	1949
John H. Beckwith	1949
Russell P. Bradlaw	1949
Norman E. Cotnoir	1949
Edward Foley	1949
Elmer R. Griffith, Jr.	1949
Frederick S. Jenkins, Jr.	1949
William A. Julian	1949
John E. McCarthy	1949
Tsu-Yen Mei	1949
William H. B. Parr	1949
Harry J. Rogers	1949
Vernon H. Russell	1949

Engineers & Constructors, a subsidiary of Raytheon Company. He became associated with the firm in 1946 as an assistant project mechanical engineer. After becoming a project manager, he was promoted to manager of the Power Department in 1966 and named a vice president of the Jackson & Moreland Division in 1969. A registered professional engineer, he is also a lecturer in power plant economics and design on the faculty of Northeastern University's Graduate School of Engineering.

MALCOLM A. MORRISON recently received a silver medal from Secretary of Commerce Peter G. Peterson for his accomplishments as a supervisory primary examiner with the Patent Office. He was cited for his "demonstrated outstanding initiative and ability in leading his art unit toward meaningful examination of applications for patents in the computer area."

DONALD L. NICHOLS has been named director for engineering at the Newport (R.I.) Laboratory of the Naval Underwater Center. In his new position he supervises nearly 650 professional engineers, technicians, and administrative support personnel. He joined the New London laboratory as an electronic engineer in 1946. Besides publishing reports dealing with sonar systems technology and low frequency electromagnetic noise, he has filed seven patent applications for underwater sources and receiving arrays.

FLOYD A. WYCZALEK presently works as a technical advisor, experimental safety vehicle, General Motors Corp., Detroit, Mich.

1949

RAYMOND A. BRANDOLI is operations manager at Universal Photo, Schenectady, N.Y. . . . CHARLES C. CHASE works as a supervisor for U.S. Steel Corp., Fairless Hills, Pa. . . . ROBERT W. COOK serves as branch manager at Gould, Inc., Instruments Systems Division, Burlington, Mass. . . . JAMES M. GENSER has been named assistant to the manager of engineering and maintenance at Ciba-Geigy Corp., McIntosh, Ala. . . . ALFRED HAPGOOD, JR., has been named product group manager, lenses and machinery for the optical products division of American Optical Corp. He joined the firm in 1949 and was later named director of quality control and was appointed lens plant manager in 1960. . . . GEORGE K. HOWE is currently an associate professor of cooperative education at Northeastern University in Boston.

1950

JOHN N. JUREIDINI is with the International Licensing Department of General Electric Co., New York City. . . . HAROLD A. SCHMUCKI is a senior electrical engineer at Warner & Swasey, Worcester. . . . CHARLES D. SEAVER serves as director of physical plant, Wright State University, Dayton, Ohio. . . . PHILIP A. WILD has been elected a vice president of Stone & Webster Engineering Corp., Boston. He was also appointed manager of marketing for the company's power industry group. He joined the firm in 1956 and has served in various geotechnical and structural engineering areas as well as marketing.

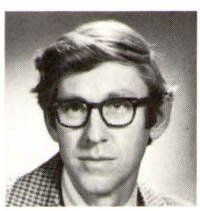
1951

WILLIAM T. BAKER is business manager for Bondstrand Products, a division of Ameron, Inc., Brea, Calif. . . . H. STUART DODGE is employed by the Space Systems Products Dept. of General Electric Co., Valley Forge, Pa. . . . LESTER A. SLOCUM, JR., is chief-architect-engineers, liaison branch, for the department of environmental services, government of the District of Columbia.

1952

PHILIP B. CROMMELIN has been named product manager, utility precipitators, at Research-Cottrell, Inc., Bound Brook, N.J. In his newly created position he will administer and promote liaison between customers and company field personnel. Since joining Research-Cottrell in 1954 he has been service engineer, application engineer, chief products engineer and manager of turnkey operations. He is a member of the Air Pollution Control Association.

Crommelin, '52



Olson, '55

1953

VYTO L. ANDRELIUNAS has been appointed chief, operations division, of the U.S. Army Engineers in New England. He is responsible for the operation and maintenance of $300 million worth of federal flood control reservoirs, four hurricane protection barriers, and the Cape Cod Canal. . . . Dr. ROBERT FITZGERALD, associate professor of civil engineering at WPI, is a new member of the Worcester Public Library board of directors. Fitzgerald, the author of a textbook entitled, *Strengths of Materials*, belongs to the American Society of Civil Engineers, American Society for Engineering Education, and the Society of Plastics Engineers. . . . JOSEPH A. HOLMES is with G.E.'s television components, Syracuse, N.Y.

1954

NEIL R. GLEBERMAN has been appointed manager of the Oil City, Pa., plant of Koppers Organic Materials Division. He had been chief engineer at the Follansbee plant since 1969. He joined Koppers in 1954. . . . JOACHIM HERZ is director, corporate product and market planning, North American Philips Corp., New York City. . . . LAURENCE I. SANBORN is with the Semiconductor Products Dept., General Electric Co., Syracuse, N.Y.

1955

ROBERT E. OLSON has been named manager of the fluid dynamics laboratory at United Aircraft Research Laboratories, East Hartford, Conn. He will be responsible for a variety of research programs related to gas turbine engines, noise reduction and pollution control. Previously he was chief of the gas dynamics section. . . . KENNETH H. RUSSELL, a chemical engineer with the ammunition development and engineering directorate, Picatinny Arsenal, Dover, N.J., was recently presented a special achievement award for "exemplary performance of duty" while assigned to Radford Army Ammunition Depot. As a member of a "should cost study team," his recommendations for improved operations resulted in a government saving of $3.5 million.

1956

PHILIP P. BEDARD is a research associate at Nova University, Dania, Fla. . . . CHARLES E. GUNN has been appointed Mayor of North Branford, Conn. He has served as deputy mayor since being elected to the council in 1971 and was designated mayor to complete the unexpired term of the previous mayor until town elections are held this year. Charlie writes that his new post is part-time and unpaid and that he keeps "bread on the table" by continuing as senior test engineer at United Illuminating Co., in New Haven. . . . GEORGE P. STROM was recently appointed director of manufacturing of Ortho Diagnostics in Raritan, N.J. He will be responsible for biochemical production, processing, packaging, and process development. Strom joined Johnson & Johnson in Chicago in 1967 as superintendent of distribution. Since 1970 he has held his present position as chief engineer, Eastern Surgical Dressings plant.

1957

JOHN M. BANDARRA, JR., is plant manager at Kendall Co., North Windham, Conn. . . . ROBERT F. I. CONTE is with Ladas, Parry, Von Gehr, Goldsmith & Deschamps. . . . Currently EDWARD M. DENNETT is sales manager, Oliver Division, Sangamo Electric Co., Atlanta, Ga., as well as sales promotion manager for Sangamo in all 50 states. During his fifteen years with the company he has been assistant regional manager in Atlanta; sales manager, automotive and industrial division, Springfield, Ill.; and district manager and sales engineer in Birmingham, Ala.

RICHARD P. JOHNSON is with Harveys of Falmouth, Inc., Falmouth, Mass. . . . ROBERT V. LEMAY, manufacturing manager, works at Data Interface, Danbury, Conn. . . . PAUL M. MITCHELL, SIM, serves as regional marketing manager at Dresser Industries, Inc. (tool group), in Cincinnati, Ohio.

LEON A. MORGAN has been appointed to the post of general operations manager at the United Illuminating Co., New Haven, Conn. He began work for the company following graduation and has served in a number of engineering positions. In 1968 he was named engineering manager. . . . THEODORE F. ROE is now an associate electrical engineer at Calspan Corp., Buffalo, N.Y. . . . ROBERT D. TENT is division engineer, Undersea Services Division (diving), at Fluor Ocean Services, Inc., Houma, La.

1958

PERRY E. JOSLIN is currently the owner and president of Joslin Dodge, Inc., Pittsfield, Mass. For the past seven years he was chief project engineer with the National Aeronautics and Space Administration program at Hamilton Standard Co., Windsor Locks, Conn. . . . MICHAEL P. MULLO is now with General Systems, Waltham, Mass.

WILLIAM A. RABINOVITCH has been selected as one of eighteen students to join the Whitney Museum of American Art Independent Study Semester Program in New York City. Upon completion of the program he will receive his MFA in painting from the San Francisco (Cal.) Art Institute. Rabinovitch is slated to be listed in the 1973 edition of *Who's Who in American Art.* . . . DAVID A. RYAN is with Martin-Marietta Corp., Orlando, Fla.

1959

The name and biography of DR. JOSEPH D. BRONZINO, associate professor of engineering at Trinity College and director of the bioengineering program at Rensselaer Polytechnic Graduate Center, Hartford, Conn., have been selected to appear in the 1972 edition of *Community Leaders of America.* The book is published annually to recognize outstanding persons who have contributed

Hear! Hear!

In 1961 Ralph Guertin received his BS in physics from WPI where he graduated summa cum laude at the head of his class. By 1969 he had completed his doctoral thesis at Yale. Today he can be found teaching theoretical physics to graduate students at Rice University in Houston, Texas.

A nice success story as far as it goes. An outstanding student has developed into an outstanding professor.

But Dr. Guertin's story is more than a success. It is a miracle. He is the first totally deaf person in this country, and possibly the world, to hold a full-time professorship in a hearing college.

How can a man who lost his hearing at the age of seven hold such a demanding position—one that requires the verbal give-and-take intrinsic in a classroom situation?

"It's because of the women in my life," he says. "Whatever success I have had is due to them."

He admits quite candidly that he owes his normal speaking voice to his mother, Mrs. Irene Nash Guertin. After a disastrous childhood bout with meningitis and measles which resulted in his hearing loss, it was she who kept him talking naturally and corrected him when he erred.

According to his colleagues at Rice University, today Dr. Guertin speaks normally during his lectures. He even finds time for spirited question-and-answer periods answering whatever questions his students may fire at him. (An A+ for Mrs. Guertin and her speech lessons!)

Another woman who helped him along the road to success was Miss Chiyona Kinoshita who taught him lip-reading at Clarke School for the Deaf in Northampton, Mass. When he entered the school in 1947 he knew nothing about lip-reading whatsoever and at first refused to try it, always insisting that his hearing would return some day. But Miss Kinoshita was patient, determined, and compassionate. In the end she won and so did young Ralph Guertin.

Now he reads lips so proficiently that he often has the feeling that he can actually hear. And people with whom he is speaking are astonished because after they say a couple of words, he can comprehend the whole sentence before they finish.

His academic excellence and his unusual ability to communicate led him to a number of interesting jobs after his graduation from WPI. For several summers he worked as a solid state physicist at the U.S. Naval Ordnance Laboratory in Maryland and at the National Bureau of Standards in Washington, D.C. Later he served as a research assistant in the physics department at the Middle East Technical University at Ankara, Turkey, and as a research assistant at the University of Nijmegen in The Netherlands.

Language was no barrier. He learned Turkish and could lip-read it in no time. He didn't have to learn Dutch because they spoke English at the university where he was employed.

Dr. Guertin can also lip-read French. He is even able to understand an Argentine student in one of his classes who speaks with a Spanish accent.

Oddly, the toughest accent for him to lip-read is British. He says, "It shows on their lips!"

Following his stint in Europe and after receiving his PhD from Yale, he became a post-doctoral fellow at the Lawrence Radiation Laboratory at the University of California at Berkeley. While there, Prof. Geoffrey Chew recommended him to officials at Rice.

Any doubts the Rice representatives may have had about their new teaching prospect promptly disappeared after they heard him deliver a lecture. They were, in a word, impressed.

Any lingering doubts that Dr. Guertin may have had also have disappeared since he has been at the university. He is quite convinced that he has no further communication problems to surmount. He plans to make teaching his career.

Should he waver, he has two more ladies to turn to. One is his wife, Nu Nu Mae, whom he met at Yale while she was earning her master's in international relations and teaching her native Burmese. And the other is their four-year-old daughter who was born in The Netherlands.

As things stand now, it looks as though Dr. Ralph Guertin has already decided exactly where he is going and how to get there. If, indeed, he isn't there already.

1883-1973
90 years of growth with/in Worcester...and more coming

WORCESTER DROP FORGING WORKS.

WYMAN & GORDON,

COR. BRADLEY STREET

And Gold St. Ct.,

WORCESTER,

Mass.

DROP FORGINGS,

IRON AND STEEL

Parts of Machines of all kinds, Fire Arms, Machine Tools, Carriage, Agricultural Hardware, &c., and all Iron and Steel Forgings received in large numbers.

Orders attended to promptly, and Estimates given on receipt of Sample.

(Company's first advertisement, in Worcester Directory)

Leaders in service to the community ... and to industry:

Aircraft • Automotive • Diesel Engines • Aircraft Turbine Engines • Space Vehicles • Nuclear Powerplants • Ship Construction • High Pressure Fittings • Marine Powerplants • Undersea Vessels •

WYMAN-GORDON COMPANY

WG

Worcester • Grafton • Millbury
Chicago • Los Angeles • Bombay
SALES OFFICES WORLDWIDE

to the life of their community, state, or nation through professional, community or civic activities. . . . ANDREW P. CUERONI holds the position of president and treasurer of Builders Realty Corp. of Massachusetts in Framingham. . . . WILFRID J. HOUDE is currently customer service manager, Hewlett Packard, Cupertino, Calif.

THOMAS F. HUMPHREY has been appointed Director of the Bureau of Transportation, Planning and Development of the Massachusetts Department of Public Works. Previously he helped develop planning and budgetary procedures for DOT agencies when he was in the office of the Secretary of the Federal Department of Transportation. He was also a cofounder of a transportation planning consulting firm whose clients included federal, state, local, and private agencies.

RICHARD P. KEATS is currently employed by Pro Electronics, Inc., Syosset, N.Y. . . . RICHARD J. RONSKAVITZ has been named traffic engineer for the City of Hartford, Conn. Since 1968 he has served the city as assistant traffic engineer. He joined the Connecticut State Highway Dept. in 1959. In 1964 he became traffic operations engineer for the City of Hartford.

1960

Married: JOHN B. CLARK and Miss Despina Chatis in Lawrence, Massachusetts in December. Mrs. Clark teaches piano and organ to private students. Mr. Clark is now head of the engineering department at Williams and Hussey Machine Corp., Milford, N.H.

PETER PIECUCH recently became editor of the *Journal of the Water Pollution Control Federation*, Washington, D.C. Since 1970 he had been associate editor. Earlier he was an assistant editor of *Environmental Science and Technology*, a publication of the American Chemical Society.

1961

JOHN M. BUCKLEY is with Buckley & Company, Wellesley Hills, Mass. . . . WILLIAM D. HOOVER presently serves as a project engineer at Decora, Fort Edward, N.Y.

Lt. Cdr. LEONARD E. PICKENS has been appointed as commanding officer of the NOAA ships Rude and Heck according to a recent announcement made by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce. The 90-ft. sister ships are the only ones of their kind in the nation designed to obtain information through wire dragging for underwater navigational hazards such as sunken wrecks, rocks, etc. Pickens assumed command of the ships on which he was previously executive officer, at the Atlantic Marine Center, Norfolk, Va.

Piecuch, '60

1962

Married: FRANCIS L. CORDEN to Miss Priscilla J. Jenkins on December 2, 1972 in Bloomfield, New Jersey. The bride is a graduate of Vassar College. The bridegroom is a member of the Norwich (Conn.) Power Squadron and is president of Destinations Unlimited, Inc., of Connecticut.

RICHARD J. Di BUONO presently works as chief, water quality section, New England Division, Corps of Engineers, Waltham, Mass. . . . LEWIS W. HUNTOON is a chemist at Benilite Corp. of America, Corpus Christi, Texas. . . . NELSON E. PARMELEE, JR., is employed by IBM Corp., in La Grangeville, N.Y. . . . JAMES N. PEISTRUP is a metallurgist at Cessna Aircraft Co., Hutchinson, Kan. . . . WILLIAM S. PROPERZIO works with the U.S. Public Health Service, department of environmental engineering, at the University of Florida, Gainesville.

DR. KENNETH ROETTGER, who usually teaches chemistry at Ottumwa Heights College in Iowa, recently tried his hand at teaching a witchcraft course. He says that "Basically, white witchcraft is nothing more than the teaching of positive thinking."

1963

GEORGE D. ELDRIDGE, who has been senior transmission engineer at United Illuminating, New Haven, Conn., is now chief electrical engineer. . . . Prof. JOSEPH R. MANCUSO, head of the management engineering department at WPI, was recently appointed to a three-year term as a director of the Worcester Cooperation Council, Inc. . . . HOWARD K. McDEVITT is now manager–optical engineering at Acuity Systems, McLean, Va. . . . Currently JOHN P. PISINISKI, JR., works as manufacturing manager at Union Camp Corp., Richmond, Va. . . . ALAN R. ROBERTS is an editor at Sperry Rand Research Center, Sudbury, Mass.

1964

ANTHONY CROCE is presently with the mechanical engineering technical support activity at the U.S. Army Electronics Command, Ft. Monmouth, N.J. . . . Frankel Enterprises, Philadelphia, employs DANIEL F. GORMAN. . . . WILLIAM J. HEALY has employment with the Hermetic Motor Products Dept. of General Electric Co. in Holland, Mich. . . . EUGENE S. KILLIAN has joined Crawford & Russell, Inc., Stamford, Conn. . . . BRUCE W. LARSEN works as staff engineer-long range planning, New England Telephone & Telegraph Co., Providence, R.I.

DAVID E. MONKS has been named general supervisor, production machining, in the Kodak Apparatus Division of Eastman Kodak Company, Rochester, N.Y. He joined Kodak in 1964. At one time he was a project manufacturing engineer coordinating work with the Kodak pocket Instamatic cameras. Last August he became the technical assistant to the superintendent of consumer products assembly. . . . STEVEN B. SACCO is with MIT's Lincoln Laboratory. . . . Currently WILBUR W. WATERS, JR., is an employee of General Electric Co., Syracuse, N.Y.

1965

RICHARD J. AIMONE is a project engineer with the Air Correction Division of Universal Oil Products, Darien, Conn. . . . GREGORY F. BERRY is with G.E.'s Machinery Apparatus, Schenectady, N.Y. . . . AYNUR CANLI is a self-employed civil engineer (export-import) in Istanbul, Turkey. . . . WALTER W. CHANG works for General Electric Co., Lynn, Mass. . . . LEONARD G. FELDMAN is with Precision Control Products Corp., Waltham, Mass. . . . JAMES L. HAMMETT, JR., serves as project engineer for Esso Research & Engineering, Florham Park, N.J.

CHARLES F. HUNNICUTT now works as supervisor-advanced switching systems at Bell Telephone Labs., Naperville, Ill. . . . KENNETH E. JOHNSON is with Cullinan Engineering Co., Inc., Auburn, Mass. . . . RICHARD G. MOORE teaches at Timberlane Regional High School, Plaistow, N.H. . . . RICHARD K. SEAVER is a senior engineer at Hamilton Standard Division, UAC, Windsor Locks, Conn. . . . MADHUKAR B. VORA has been promoted to senior engineer at the International Business Machines Corp., System Products Division Facility, East Fishkill, N.Y. In 1962 he began work at IBM as a junior engineer working on advanced devices. . . . BRUCE C. YUNG is a graduate student at the University of Virginia in Charlottesville.

1966

Capt. ROLAND C. BOUCHARD, development engineer, is stationed at Hill AFB, Utah. Currently he is working for his ME in electric power engineering at RPI. . . . ROBERT COATES is presently working for the Torrington (Conn.) Company in the knitting machine needle department. He is supervisor of two production departments. Last summer he received his MS in management science from Rensselaer Polytechnic Institute at the Hartford Graduate Center.

PHILIP J. HOPKINSON has been appointed manager of advanced development engineering at G.E.'s distribution transformer department with headquarters in Hickory, N.C. He began work with the company in 1966. . . . CHESTER J. PATCH III now works as a senior field engineer at Bechtel Corp., San Francisco, Calif. . . . MICHAEL F. SALVINI is a wire mill superintendent for Interspace Corp., in Solon, Ohio. . . . Currently ROBERT A. SINUC is employed as a project engineer in the plastics department at General Electric, Selkirk, N.Y.

. . . JAYANT T. THAKKER is design engineer at L. K. Comstock Co., Pittsburgh, Pa. . . . DR. JOSEPH E. WHALEN is a member of the technical staff at Computer Sciences Corp., Silver Spring, Md. He received his PhD in physics from the University of Florida last year.

1967

Married: DONALD G. LUTZ and Miss Susan A. Murdock of West Springfield, Mass. on December 30, 1972. Mrs. Lutz is a graduate of Westfield Teachers College. Mr. Lutz is employed by Monsanto Chemical Corp., Springfield.

GEORGE E. C. BATTEN, JR., presently serves as director of Bi State Community Health Project, Hanover, N.H. . . . EDWARD S. CIARPELLA, after a year's study at Illinois Institute of Technology, Chicago, has returned to Tiverton (R.I.) Junior-Senior High School as an instructor in mathematics. . . . Ramapo College, Mahwah, N.J., employs JOEL B. KAMERON as an assistant professor. . . . ALAN E. LARSON is director of computer services at Clark University, Worcester. . . . ROBERT J. LOCKWOOD is now a system engineer at Raytheon Co., Fremont, Calif. . . . EDUARDO A. MENDEZ holds the post of vice president and treasurer of Contreras & Mendez Construction Corp., Ponce, Puerto Rico. . . . PETER R. PICARD serves as assistant area engineer for the Federal Highway Administration, Columbia, S.C. . . . WILLIAM F. PRATT has employment with New England Telephone, Warwick, R.I. . . . JOHN SOULLIERE is presently with the Boston office of the Foxboro Company. . . . ALAN H. SUYDAM is product design engineer, Product Development Group, Ford Motor Company, Dearborn, Michigan.

1968

ALBERT J. ATTERMEYER, naval architect, works at Boston Naval Shipyard, Boston. . . . MICHAEL J. BABIN has accepted the position of project engineer with Chemelex, Redwood City, Calif. The company deals with electrical heat tracing systems and water bed heaters. . . . ROBERT G. BALMER is at the Purdue University graduate school, West Lafayette, Indiana. . . . EDWARD F. CANNON, JR., has been named assistant director of athletics at Worcester Academy. He is also a member of the school's Science Department. . . . CARL G. R. CARLSON, JR., has received his PhD in mathematics from Stanford University in California. . . . GREGORY C. COX is a chemical engineer for the U.S. Navy at Naval Ordnance Station, Indian Head, Md. . . . DANIEL C. CREAMER works for the Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn. . . . Esso Research & Engineering Co., Florham Park, N.J., employs JOHN D. CUNIC as a project engineer.

STEVEN C. HALSTADT, who is a second-year student at Amos Tuck School of Business Administration at Dartmouth College, has been elected an Edward Tuck Scholar. The award is the highest academic recognition granted by the school prior to graduation. . . . THEODOR A. HEIDT is an ensign with the Civil Engineer Corps (U.S. Naval Mobile Construction) out of San Francisco, Calif. . . . U.S. Army Capt. and Mrs. JOHN R. HILYARD, who have been living in Panama for over a year, are the parents of two children, John K., 2, and Chrisanne, 4 months. John's twin brother, JOSEPH F. HILYARD, is assistant research engineer for highway safety at the University of Michigan. GARY B. LARSON works for General Electric Co., Utica, N.Y. . . . EUGENE L. MURPHY is a planning assistant at the Massachusetts Science of Technology Foundation, Wakefield, Mass. . . . THOMAS J. PERARO, systems analyst, currently works for Aetna Life & Casualty, Hartford, Conn. . . . CHARLES A. RINALDI is with Northeast Utilities Service Co., Berlin, Conn. . . . LEO T. SPRECHER serves as a computer research analyst at GTE Labs, Waltham, Mass. . . . JOHN R. TRUDEAU is with General Electric Co., R&D, Schenectady, N.Y.

1969

Born: To Mr. and Mrs. PAUL S. WOLF, their first child, Howard Philip, on November 13, 1972.

VESA I. AUNIO works at General Electric Co., Fitchburg, Mass. . . . ANTHONY J. BAGLINI is with Turn-of-the-Century Antiques, Cambridge, Mass. . . . JEFFREY C.

JACK H. McCABE, '68 and RONALD J. GORDON, '67 recently joined forces and came up with some leading edge work that has led to the implementation of a computer package, Mini-Plan, that is now being sold by IBM to businesses throughout the country.

The work was performed at Hammond Plastics, Inc., Worcester, where McCabe is director of management information systems.

Their accomplishment is considered significant because it is the first time that a small company with a small computer has been able to perform the same type of financial analysis previously attempted only by large companies with large computers. In fact, practical planning models at Hammond can now be implemented on a System/3 computer as well as on a more recently initiated disc-based version.

At first it wasn't known if such a plan was feasible. But when Hammond decided to establish a corporate objective of increasing revenues by 20 percent across the board in 1971, it looked to its System/3 as a possible tool to reduce the repetitive manual calculations involved.

Gordon, who is a systems engineer for IBM, developed the conceptual model for Hammond Plastics' income projections.

"We proved this on a System/360 model 50," says McCabe. "And then we developed simplified, open-ended routines to express the profit and loss parameters in the English-like language of System/3. Ultimately we were able to program balance and cash flow projections directly in the RPG II language without any need for conversion."

Now Hammond has converted to a disc system and implemented Mini-Plan which offers a simple method for organizing planning data, for establishing computational logic to apply to the data, and for generating reports.

According to McCabe Mini-Plan makes it easier to make inquiries and extends the range of "what-if" questions the company can pose to the system. One such "what-if" question resulted in a $5,000 savings on a resins order that Hammond made.

The accuracy of the company's new financial models runs to within 3 to 5 percent of their projections. "This is accurate enough to be extremely useful," McCabe concludes.

Plastics World and *dp/Solutions* recently featured articles highlighting the work done by McCabe and Gordon.

1971

Married: I-CHIEH EDGAR WANG to Miss Da-Ching Patricia Ma on January 6 in Worcester. The bride is a candidate for a master's degree in computer science at WPI, where her husband is a doctoral candidate.

MARK A. AGLIO now serves as an assistant statistician for the Federal Conciliation and Mediation Service, Washington, D.C. . . . GEORGE E. BLOCK, JR., works for New Haven (Conn.) Water Co. . . . JOHN W. CAPITAO is with G.E.'s Mechanical Drive Turbine Products, Fitchburg, Mass. . . . JOHN G. CLIFT works for Benthos, North Falmouth, Mass. . . . CORNELIUS J. COLLINS has employment with New England Power Service Company, Worcester. . . . STEPHEN B. DOUGLAS is presently located in Venezuela, South America. . . . WILLIAM N. IULIANO is with General Electric Co., Fitchburg, Mass. . . . ROBERT H. MANDELL is employed by Datatrol, Hudson, Mass. . . . PAUL B. POPINCHALK has a position with General Electric Co., Wellesley, Mass. . . . JOHN R. SHOTLIFF is a graduate assistant at WPI. . . . STEVEN C. WATSON works for New England Telephone, Springfield, Mass. . . . ELDEN E. YORK is an electrical field engineer with the Philadelphia Electric Co.

BERNARD serves as assistant physicist at Calspan Corp., Whippany, N.J. . . . HEMENDRA R. BHATT is employed by United Engineers, Boston, Mass. . . . ALAN C. CHAMBERLAIN is with GTE Sylvania Electronic System, Needham Heights, Mass. . . . ROGER J. DASHNER is employed by Boston Edison Co. . . . Currently DAVID W. EATON is a programmer on-site in Annaba, Algeria for General Electric Co. . . . ALFRED FREEBERG works for General Electric Co., Pittsfield, Mass. . . . PETER T. GROSCH is a customer service representative for Exxon Company and is located in Pittsburgh, Pa. . . . GLENN E. HARKNESS is a transportation planner for Alan M. Voorhees & Assoc., Inc., Boston. . . . RICHARD P. ROMEO is section chief at Western Electric, North Andover, Mass. . . . ROBERT TEMPLIN is now a claims attorney with the Travelers Insurance Co., Hartford, Conn. . . . JAMES R. WALKER, JR., presently has employment with General Electric Co., Wellesley, Mass.

1970

FRANCIS L. BELISLE, JR., has been promoted to the rank of captain in the U.S. Air Force. He is assigned to the armament development and test center at Elgin AFB, Fla., as the center mathematical computer programmer. . . . JOHN R. BOYD is a biomedical engineer at St. Vincent Hospital, Worcester, Mass. . . . WILLIAM S. COBLENZ is with General Electric Co., Ceramics Branch, Metallurgy and Ceramics Laboratory, Schenectady, N.Y. . . . DONALD A. COLANGELO of Harland Bartholomew & Assoc., is located in Memphis, Tenn. . . . ROBERT C. COURNOYER teaches at Bishop Guertin High School, Nashua, N.H. . . . DOUGLAS J. DAYTON is with General Electric, Pittsfield, Mass. . . . PAUL F. DRESSER was recently promoted to Navy lieutenant (j.g.) while serving with Attack Squadron 125 at the Naval Air Station, Lemoore, Calif. . . . JOHN N. DUCIMO is a sales representative with U.S. Steel Corp., Electrical Cable Division, Worcester.

JOHN "JACK" GALE, assistant golf professional at Green Hill Golf Club, Worcester, recently led his team to victory in a pro-member tournament at the Port Malabar Country Club, Melbourne, Fla. The team finished with a 14-under par 57. . . . JAMES J. LAMBERT is with General Electric's Mechanical Drive Turbine Products, Fitchburg, Mass. . . . PAUL R. LaPLANTE serves as a research physicist at the U.S. Army Electronics Command, Ft. Monmouth, N.J. . . . KENNETH H. MAYMON works for General Electric Co., in Fitchburg, Mass. . . . MICHAEL T. MOYLAN is an engineering representative at Aetna Life and Casualty, Boston. . . . BRADFORD F. MYRICK serves with the U.S. Army in Germany.

CHARLES R. PICKETT, JR., is an engineer at Nuclear Power School, General Electric Co., Knolls Atomic Power Laboratory, Schenectady, N.Y. . . . RICHARD H. STEEVES, JR., works as plant supervisor for Dewey and Almy Chemical Division of W.R. Grace & Co., Woodbury, N.J. . . . ROBERT T. STULA has received his MS in chemical engineering from Penn. State University. . . . GARDNER D. TARBELL works for the Connecticut Department of Transportation in Hartford. . . . MICHAEL D. VARDEMAN is a graduate student at Colorado State University, Fort Collins. . . . FRANCIS A. VERNILE, who received his MS degree in structural engineering from the University of Connecticut last year, is now employed by the structural engineering firm of Fraioli-Blum-Yesselman of New England, Hartford, Conn.

1972

Married: LEONARD C. ANDREOZZI to Miss Judith Ann Boyle in West Barrington, Rhode Island, on December 30, 1972. The bride is a graduate of Clark University. The bridegroom is a doctoral candidate in chemical-physics at West Virginia University. . . . SAMUEL T. DAVIS and Miss Dale B. Alexander on November 25, 1972 in Maynard, Massachusetts. JOSEPH SZLOSYK was best man. WILLIAM SINGLETON, '72, and MARK St. PIERRE, '71, and ED SHERMAN, '71, were ushers. Mrs. Davis attended Becker Junior College. Her husband is employed at General Electric Co., Erie, Pa. . . . DANIEL J. HARRINGTON III to Miss Lynn C. Wentzell in Jefferson, Massachusetts on November 10, 1972. The bride is employed by Warner & Swasey Co. Mr. Harrington is a salesman for Sunnyside Motor Co., Holden.

JAMES G. BROOKS, JR., is a nuclear steam supply system engineer at Combustion Engineering, Windsor, Conn. . . . JARED A. BRUCKNER is assistant professor of mathematics at Atlantic Union College, South Lancaster, Mass. . . . JOHN F. BURKE is employed by the City of Worcester. . . . MARK A. FRITZ teaches mathematics at Berlin (N.H.) Junior High School. . . . JOHN P. GALLIEN is employed at GTE Sylvania, Danvers, Mass. . . . Lt. STEVEN H. LUTZ is a platoon leader with the 68th Engineer Co., Ft. Bliss, Texas. . . . DAVID A. MEYER serves as assistant manager, production control, at American Optical, Southbridge, Mass. . . . ANIL N. MODI works as an assistant buyer in the purchasing department for the City of Worcester. . . . ROBERT F. WEIR is a sales engineer for General Electric Co., Fitchburg, Mass.

BEFORE YOU BUY PIONEER, KLH, MARANTZ, FISHER... LISTEN TO THIS.

We don't feel you have to pay a lot to get the high quality audio sound and features you want.

Just listen to us.

You'll be surprised at how good the Sylvania audio component system* pictured below sounds.

Our speakers have a lot to do with it. They're the air-suspension type that deliver solid, natural bass sounds. Each of those cabinets contains a 12" bass woofer, a 1½" dome mid-range, and a 1" dome tweeter. And their fidelity is remarkable. Even a leading stereo magazine agrees. They've given our speakers rave reviews.

When it comes to features, we feel that our receivers match up with the popular models in their price category. Solid-state. FET's. Ceramic filters. Tuning meter. Full-function jack panels. Built-in four-channel high-level matrixing circuitry. Plenty of power (50 watts RMS per channel into 8 ohms with both channels driven simultaneously at 1 kHz for Model CR2743A). And plenty of controls for all functions.

Our changers are the best there are, because they're made by the best there are—Dual, Garrard & BSR McDonald. And they're made with all the right features—viscous-damped cue-pause control, calibrated anti-skate control, magnetic cartridges, and diamond styli.

If this sounds like the kind of audio equipment you're looking for, go see your local Sylvania dealer.

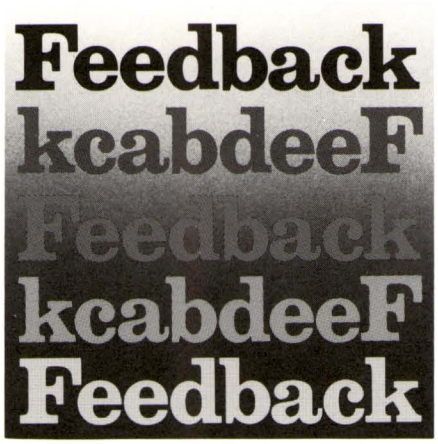
And listen to the Sylvania audio component systems. Depending upon the features you want, prices start as low as $279.50**.

Which just goes to prove, it pays to listen.

*System above includes receiver CR2743A, changer T2705W, and speakers AS125A. Mfr's suggested list price $659.50.
**Mfr's suggested list price.

GTE SYLVANIA

Sylvania Entertainment
Products Group, Batavia, N.Y.



Covers

Congratulations on your December 1972 issue. When I received it, I set it aside thinking it was an international magazine to which I subscribe, and which I usually take along on business trips to read more thoroughly. Imagine my surprise to open it on the Metroliner to Washington and learn the significance of the flags and our exchange students from City University.

I read every word of the students' comments, because I love London, and we have entertained British friends who had never been in America and they also had some weird ideas about our country.

I also enjoy your "Feedback" section. Good old Tech is certainly becoming a leader in engineering education.

Arthur C. Manning, '27
Upper Montclair, N.J.

The Brother Machine

As the mother of a freshman at WPI, I am very pleased to receive the *WPI Journal.* I read with tremendous interest your article about "Bill and the Brother Machine." I was particularly interested as I work part-time for the Beverly Public School Department in one of the grammar schools and know of young boys who could use the help of a "Big Brother."

Yesterday, when our adjustment counselor came to visit the "problem" children in our school I showed him the article and he shared my interest in the program, as we have four colleges in the immediate area. He asked me if it would be possible to obtain a copy of this article for him, and this is the purpose of my writing to you.

Louise E. Menesale
Beverly, Mass.

REUNION 1973

THURSDAY JUNE 7—SUNDAY JUNE 10

SPECIAL REUNION CLASSES

1918	1923	1928	1933
1938	1943	1948	1953
1958	1963	1968	

When the pack comes down the chute at Indy, we'll be there in spirit. The Norton Spirit.

That's the name we've chosen for the championship race car we'll be campaigning on some of the world's toughest testing grounds... a lean, tough rolling projectile crammed to the throttle with 850 horses of double overhead cam turbo-super-charged power!

Sponsored by various divisions of Norton Company whose products are closely linked to the manufacture and fabrication of most automotive parts, this sleek racing machine will hit the U.S.A.C. championship trail from Indianapolis to Ontario, from the Pocono 500 to the Michigan 200.

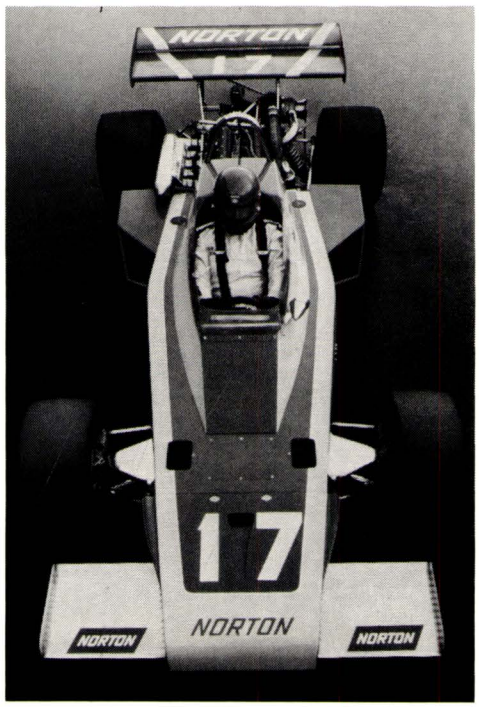
Our entry in this internationally renowned sports event underscores the important role Norton products play in the automotive industry. It also reflects the combined talents, skills and competitive spirit of Norton's 18,000 employees. It is this same spirit of endeavor and a genuine desire to excel that has made Norton the world's largest and best known manufacturer of abrasives and a prime supplier of industrial ceramics, pressure-sensitive tapes and plastics and synthetics.

Keep your eye on the new Norton Spirit... an exciting symbol of a company and people that are on the move! Norton Company; World Headquarters, Worcester, Massachusetts 01606.

Norton grinding wheels are depended on for precision grinding and finishing of critical engine components, transmission parts, drive shafts, steering gear and front wheel suspension parts.

Norton coated abrasive belts, sheets and discs play an important part in grinding brake shoes, crankshaft lapping and in the preparation and finishing of all types of metal and fiberglass automotive panels.

Because they grip curved and irregular surfaces tightly and strip off quickly and cleanly, Norton pressure sensitive masking tapes are used extensively in the preparation and final painting of automotive bodies.



Norton industrial ceramics, including refractory cements, are widely used to line melting furnaces in which automotive engine blocks and other components are cast.

Norton abrasive materials are selected for their long life and increased productivity on a variety of automotive production applications including the deburring and finishing of gears, carburetor parts, connecting rods, ball joints, butterfly valves and thermostats.

Norton TYGON® tubing is ideal for low pressure fuel, vent and refueling lines where high visibility is required.

NORTON

Nobody has a better track record.