

"The greater the
Truth the greater
the Libel."

The Dome

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PMC COLLEGES

FEBRUARY 18, 1966

CULTURAL AFFAIRS

Lectures And Symposium Highlighted

By Kirk Newsom

Dr. Peter Viereck will give the annual Pew Lecture this year in the Alumni Auditorium on Thursday, February 17, at 7:30.

Professor of Modern Languages and European History at Holyoke, Dr. Viereck is a winner of a Pulitzer Prize in Poetry and has written several books.

Mrs. Arthur O. Katels will conduct a symposium on Lord Snow on Tuesday, February 22, in the Faculty Lounge of Kirkbride Hall between 9:00 and 11:00.

The symposium is a result of pressure for a follow-up of Lord Snow's visit last month. The consensus of opinion is that Lord Snow "created a stimulating climate by virtue of his residency."

Mrs. Katels has been very close to Lord Snow and is very familiar with his work and personality. She wrote *Time and Hope*, a play about Lord



MRS. ARTHUR KATELS

Snow, which was produced at the Playhouse in the Park in 1963.

Prof. DiTaranto, Prof. Gottlieb, and Prof. Sophocles will assist Mrs. Katels. Dr. Sophocles and Mrs. Katels are now collaborating on a biography of Lord Snow which will be published next year.

The president of Hahanaman Medical College, Dr. Charles S. Cameron, will lecture on "New Trends in Medicine" in Kirkbride Hall on Thursday, February 24, at 1:00.

PMC Civilian College Is Named For William Penn And John Morton Duel Schools Are Placed Under Title "PMC"

The new civilian college of PMC will soon acquire the name Penn-Morton College it was announced by President Clarence Moll at an assembly of the Student body on February 15.

Moll noted that a fundamental consideration in this action was the retention of the initials (PMC), inasmuch as this appellation has become recognized and respected in a period of over 100 years as representative of a fine academic institution.

Thenceforth, the college will become the umbrella name PMC colleges, within which will be subsumed the traditional Pennsylvania Military College, the newly bred Penn-Morton College, and will provide for additional colleges as PMC proceeds with its vast program of expansion. Moll noted that this program called for PMC to become a co-educational in the fall of 1967; a nursing program in conjunction with Crozer Medical Center is in progress; a graduate program in engineering is planned.

In discussing the college's future, Moll said that, "PMC is unusual among colleges—not in its effort to achieve educational excellence now, but in its manner of achieving it—namely, through educational innovation. PMC is and will continue to "leapfrog" the barriers of educational rigidities and traditions by offering its students today, the elements of training which they will need to be in a role of responsible leadership twenty years hence. At PMC, curriculum research and innovation are the instruments through which we seek to discover what will have to be known tomorrow, in order that we can implement it today."

Moll said: "We believe it an interdisciplinary experience for students because man lives in, is affected by, and seeks to enjoy and master an inter-disciplinary world."



This aerial view of our campus will soon be an archaic one.

PROFILE

William Penn John Morton

William Penn was the founder of the Commonwealth of Pennsylvania. Born in Tower Hill, London, England on October 14, 1644, the English Quaker spent his entire life advocating civil and religious liberty.

Penn became the proprietor of Pennsylvania in 1681, and a year later, sailing on *The Welcome*, he landed at what is today Chester. He had been given the large tract of land by King Charles II of England in payment for a debt owed to Penn's father. At that time the land to become the Commonwealth covered portions of what is now southern New York State and northern Maryland, as well as all of what is now Delaware and Pennsylvania. This land grant gave Penn his most promising opportunity to put the religio-political ideals nurtured by his Quaker-Whig faith into practice. He looked across the Atlantic to realize his dream of an ideal Christian Commonwealth where, under the guidance of the Inner-Light, conscience might be free, government responsible, and righteousness universal.

The American patriot John Morton

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Cadets And Instructors Honored

Cadet Glendennis,
Col. Smith Attend

A luncheon honoring the senior ROTC cadet colonel and professor of military science of local colleges was held Tuesday (Feb. 8) at Carlisle Barracks, Pa.

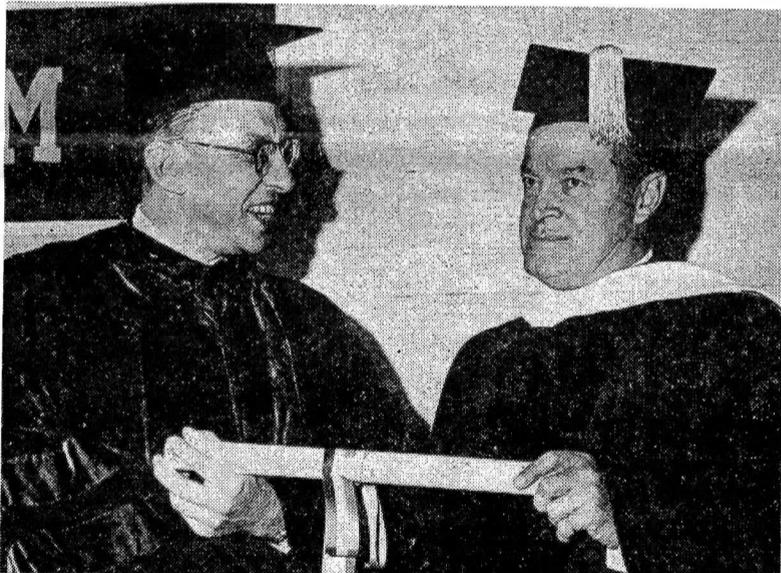
Following the luncheon ROTC cadets and their professors were given a briefing on the mission, curriculum and purpose of the Army War College and the position of the War College in the Army school system by Lt. Col. James J. Ursano, chief of the Plans and Policy section at the Army's senior school.

Major General Eugene A. Salet, commandant of the Army War College, gave a short welcoming address to the guests prior to the luncheon. Also addressing the luncheon group were Major General Van H. Bond, commanding general XXI U. S. Army Corps (Reserve), Major General Henry K. Fluck, commanding general of the 28th Infantry Division (PANG), and Colonel C. W. Coghill, chief, ROTC Division, Headquarters U. S. Army, Fort Meade, Md.

Among the area colleges represented were the University of Pennsylvania, Temple University, Dickinson College, Lafayette College, Gettysburg College, Western Maryland College, Bucknell University and Pennsylvania Military College.

The visit was sponsored by General Salet in order to support and promote the vital college ROTC program, to expose the cadets to the senior Army educational facility, and to encourage qualified and interested cadets to further consider the Army as a career. General Salet in greeting the students said, "About 70% of our company grade officer corps is composed of men who receive commissions through the ROTC and the need is as vital today as it ever has been in the past." The commandant urged each student to pass on to his fellow cadets the information gleaned from their exposure to the school.

Following the briefings, the visitors were taken on a tour of the historic military post before departing for their respective schools.



Bob Hope as he appeared when receiving his Honorary Doctor of Humane Letters degree on January 29.

Will Eagles Train Here

By Carl Lobel

It is a funny thing about rumors; they have a tendency to run rampant for a while, and then, lacking confirmation, they quickly die. Here is one that may receive confirmation any day. The Philadelphia Eagles of the NFL may use the athletic facilities of PMC in the near future!!

The following is an extract from an article by Hugh Brown which appeared in the *Philadelphia Evening Bulletin* on Feb. 14.

"Just what the Eagles are going to do in the way of a training camp should be known within the next two months. There is even some talk of using the PMC facilities at Chester."

Giving substance to this rumor is the announcement by Dr. Moll on Feb. 15 that plans are under way to construct a new athletic complex containing a field house, tennis courts, swimming pool, and amphitheater. Facilities such as these would be a very attractive inducement for luring the Eagles to Chester. In addition, Chester, being in close proximity to Philadelphia, would allow Eagle fans to watch their favorites in action dur-

College Text - Books Exempt From Tax

After July 1st, the textbooks will be exempt from the Pennsylvania State sales tax. The exemption is provided by a House-Senate Conference Committee Report recently accepted by the state legislature.

Thomas A. Frascella, chairman of the House Ways and Means Committee, explained the legislative action in these words, "Since we were offered a choice of accepting or rejecting the package on the last day of the session, we decided to accept it and thereby save the students in the Commonwealth's private and parochial schools and colleges thousands of dollars."

ing the off-season.

If this conjecture seems overly speculative, add to the mixture the name of Joe Kuharich, head coach of the Eagles. Kuharich was seen in the company of the PMC Athletic Director, George Hansell, about two weeks ago. Mr. Hansell led Coach Kuharich on a guided tour of the PMC campus.

Funny thing about rumors, sometimes they are true.

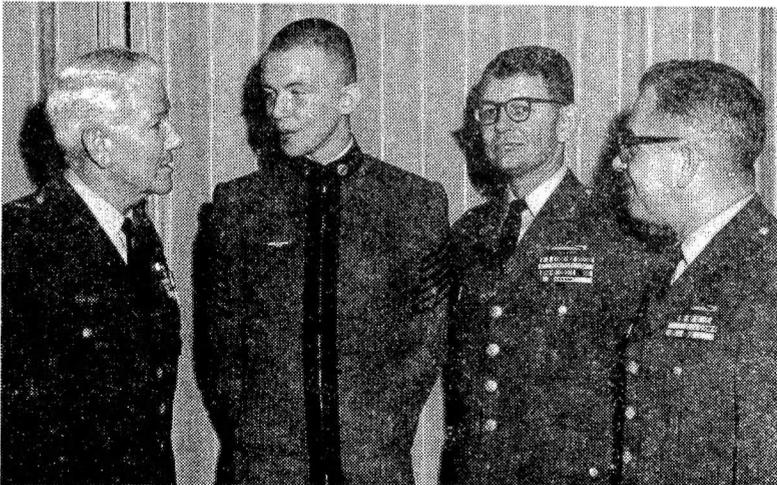
English Club

DR. LOWE SPONSORS SPEAKING CONTEST

A Public Speaking Contest will be held on Saturday evening February 26, in the Alumni Auditorium. The topic of the contest is "What is an Educated Man," and there will be awards of \$50, \$30, and \$20 given to the three best orators.

The English Club, which is pro-

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CARLISLE BARRACKS, PA.—Pictured are (l-r) Major General Eugene A. Salet, U. S. Army War College commandant, Cadet Glenn A. Dennis of Pennsylvania Military College, Colonel Samuel C. Smith, professor of military science at Pennsylvania Military College, and Colonel C. W. Coghill, chief, ROTC Division, First U. S. Army, Fort Meade, Md.

Registration

It may be remembered that we began the current academic year editorially on an unhappy note, questioning why "registration at PMC has to be a semi-annual wreck of confusion and bitterness," and observing that complaints on this score were continually ignored. The latter observation was evidently incorrect; the complaints were not ignored, and this semester the registrar's office and the finance office produced a system of registration effective, efficient, and indicative of genuine regard for the student's convenience. We heard innumerable expressions of gratitude from the students pertaining to this major improvement, and we wish to convey their thanks along with our own to those members of the administration responsible for making registration a relatively pleasurable event.

Campus Political Parties

We find Mr. Brennan's proposal concerning the formation of political parties on campus interesting. Brennan's remarks raise a number of questions; some of which go to the premises upon which his proposals are based. We might question whether the degree of student interest in campus political organs is sufficient to sustain political parties; we might certainly question whether SPIRE was a political party, whether parties, if created, could function under the aegis of the Student Government Association, and whether political parties, if formed, would be beneficial, detrimental, or irrelevant to "PMC's future"; we might even, on the basis of personal observation, question whether a political science professor necessarily knows "the fundamentals of politics," (but that question deserves an editorial all its own).

To begin, the level of political interest and awareness on campus is negligible. This is readily apparent in the fact that a number of candidates regularly, run unopposed. If further evidence is needed, stop a student at random and ask for the names of five people on student council or ask him to tell you what council does. A political party exists to obtain political powers—the power to govern. We question whether the Student Government Association possesses such power. Where is it evident? If we conclude, as we must in the absence of evidence, that no such power exists, then where is the need for political parties. Just because student government is a potential power base it does not necessarily follow that power resides there. To develop power on the available base would require that council leaders capture the imagination of a major part of the student body by providing the sort of leadership they will be willing to relate to. Council has consistently failed to provide such leadership since its inception.

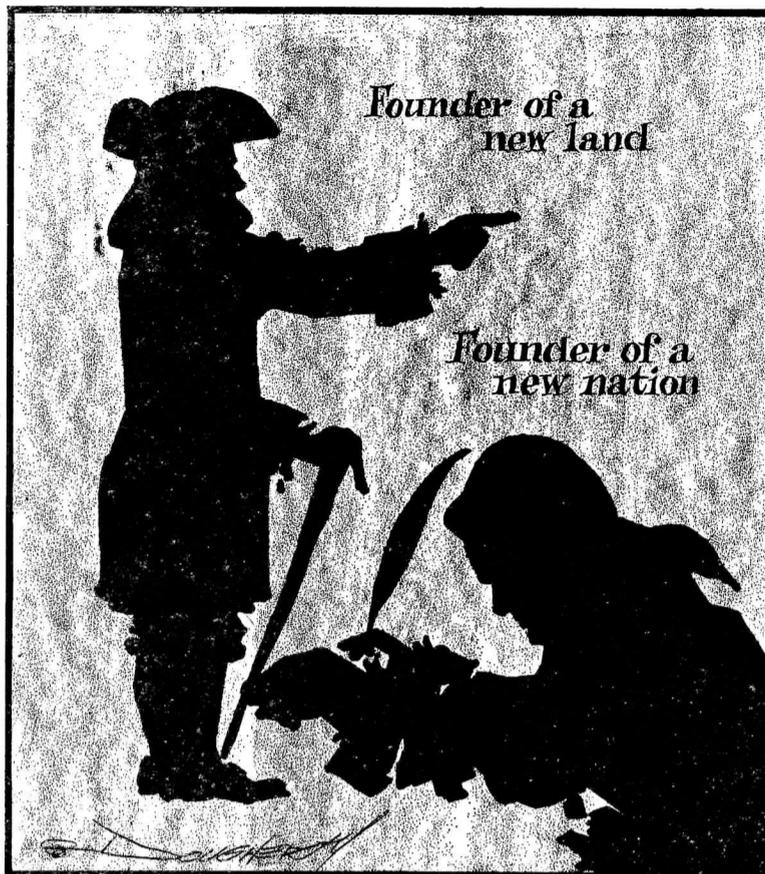
Though SPIRE was conceived and executed with a degree of secrecy apparently necessitated by the nature and personalities of the political "leadership" on campus last year, it seemed to us then, as it does now, that SPIRE was an *ad hoc* development aimed at revealing the non-functional nature of that then-prevailing "leadership," and compelling genuine political activity on campus. SPIRE succeeded on both counts. Beyond this, though it elected a substantial number of men to council, it did not accede to a position of leadership on council. And, as it did not accede to leadership, it ceased to exist, having no further purpose. We submit that this would be the experience of any political party formed on campus. The facts are that the constitution does not provide a political framework within which a two-party system could function; a multi-party system on a campus of only 1200 students, a substantial number of whom are so politically disinterested that SGA could not muster a vote sufficient to decide yes or no on a new constitution at last year's elections, is patently absurd; and, a one-party system, if one would posit such a thing, would not differ substantially from the no-party system which now exists. (Just ask a political science professor.)

The matter of whether political parties could function under the aegis of the SGA brings into question the whole election system now in existence. There were sufficient irregularities in last year's elections to call into dispute the legitimacy of the present student council. These irregularities were charged to SGA and attributed to the fear, generated by SPIRE, that those picked for election might not be elected (some of you may recall one SGA "leader" boasted he had already chosen the man who would replace him—before the election was ever held. Small wonder students see council as a self-perpetuating clique). We suggest the credibility of SGA might be enhanced by putting elections into the hands of a disinterested body, thereby obviating any question of intentional irregularities.

The question whether political parties are vital to PMC's future reverts to the matter of student interest in student government, and the fact that SGA has yet to reveal itself as a vital force on the PMC campus. This is borne out by a public statement Mr. Brennan made last spring with regard to SGA's proposed constitution: "It might be mentioned that after all the time we spent on a constitution, and after allowing the students an opportunity to discuss this with us (SGA) on Thursday, we had eight members of Student Council available for this purpose, and a total of three students showed up." As student council is evidently irrelevant, it would seem that political parties must be also.

It is true that student council does much that is not readily apparent (such as helping out at registration, running mixers on occasion, etc.), but there is much more that it can do, and this would include a more straight-forward method of dealing with the student body. In the Jan. 14 issue of THE DOME, Mr. Brennan, referring to the Spring Festival, writes: "The event of importance to me in the new year is the Spring festival, which as of now is now off the ground. Talent is usually signed by this time in order to insure a decent group. Student council will look into the Festival, and if nothing is being done, it will take over and run the festival." Now, the obvious implication is that the Spring Festival was not originally the responsibility of student council. However, the fact that council appointed the man who failed to get the Festival "off the ground" indicates the contrary. We contend responsibility lies with council, and question why council president takes a position from which he can seem to rescue a failing enterprise, while obscuring the fact that it is his fault to begin with that the thing is failing. Council might increase its influence among the students if it depended more on hard work and leadership and less on obfuscation and circumlocution to enhance its stature.

Finally, on the matter of political parties, last year Council member Mike Sullivan, commenting on SPIRE, said: "I ran for council to represent my class, not a political party." We endorse Mike's sentiments. We don't believe this is "an optimum time for change" to a party system. There are too many intermediate changes needed first.



Time For A Change

by Patrick J. Brennan

Pres. Student Govern Assoc.

There is always an optimum time for change. If change is tried before or after this time, it either fails or, at best, does not achieve its maximum results.

There are changes needed at

PMC and now is the time. It is time for a new political awareness and a new political structure: one that takes the different categories of PMC students into consideration. We must arrange for equal representation not only of cadets and civilians, but also of boarding and day students. Now is the time for these changes.

If we take the stand that changes are needed and that now is the time, we are faced with the big question: How do we make the necessary alterations? This is one without a definite answer. No solution will fit exactly. Of course, some will be better than others.

The easiest method to insure that we had equal representation would be for student council to change its constitution to state that if the class president is a cadet, the vice-president must be a civilian. Then alternate this down the line of officers. This would do the job, but it would not stir interest.

The best method would be that of political parties. Again this would show that there is a right time for everything.

Last year we had an attempt at a political party. SPIRE raised a lot of noise and plastered the campus with posters, handbills and everything else. But the campus was not ready for SPIRE, although it had a lot of spirit and was the result of a lot of work, and it slowly died away.

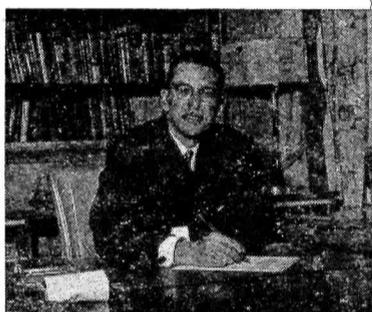
We need not only a SPIRE, or whatever the name; but another party—an INSPIRE perhaps—to complete the picture. These parties could draw support from all phases of the college structure, and therefore insure representation for everyone.

It is true that in this system, if one did not get out and work, he may not be represented; but that is the system of politics and not necessarily an evil.

The formation of parties rests mainly with the class of '67, although they will need leaders and candidates from both '68 and '69. The senior class could lend some experience and help, but it is mainly up to the underclassmen. It is they that will be living under it.



From the President



Dr. Clarence R. Moll

Each of us experiences a comeuppance at one time or another. For the college student, this occurs more often than not at the end of the semester. It is then that the total assessment of one's efforts for the term is fully recorded. To some, the receipt of the outcome is a pleasant experience; to others, it is a disappointment, sometimes a shock. Most often the latter type student spells out for himself a whole new set of disciplines which presumably will prevent another occurrence. Of course, the same type of resolutions was probably made the semester before, and the one before that, and like New Year resolutions they soon evaporate into thin air.

Just for the moment, let us discuss the PMC midyear "comeuppance" approach. For freshmen, we assume that they should have the

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If there are enough students vitally interested in PMC's future to start political parties, we need a basic set of rules for the conception of these parties. We will also need the advice of those who know the fundamentals of politics, in short, a political science professor.

We then can state the basic steps for starting a political party. First, a group of students must decide what they feel is needed in the school, formulate the changes they want, and write their platform. They should then choose an interested faculty member for the reasons stated above.

With this accomplished they can then register with the Student Government Association so that they will be completely familiar with the positions open and rules governing them, e.g., academic regulations. This will also insure that the name of the party appears with the candidates on the ballot. A third result of the registering of parties would be the inclusion in the *Student Handbook*, along with their platforms and basic concepts.

Most seniors try to change the entire school in their final year. If I could only institute these changes, I would feel my term in office a success.



From the Commandant
Col. Noel Menard

In the "hindsight department" I recall writing for an earlier issue about "what a good year might look like."

And although one semester is by no means a year, I certainly have to say that what happened during the first semester can add up to "a good year." In any case, I had the extreme pleasure of hearing the President say "it has been a good year."

So I don't think I am being phony when I say we can chalk up the first semester as being a good one for the Corps with plenty of excitement, plenty of accomplishments, plenty of new experiences and all through it, a "cracking good" First Class standing firmly at the helm charting the course.

Of highlights and landmarks we had plenty, and all of them important. But the most important of all to my way of thinking was in the disciplinary department. I simply can't describe what it means to have a man who has done something wrong, come in and own up to it. And we had enough good men who did this to give me the impression I was dealing with men of character, men of great consequence.

In the "looking ahead" department, I would have to start with the fact of integration which occurred last Saturday morning (incidentally, I was most impressed with the efficiency and the ease with which the Corps made the BIG MOVE, due entirely of course, to the careful planning which Mr. Symolon and Mr. Dennis did during the mid-year furlough).

Integration we have talked about and argued about and now it is here. And it may well be the most important factor in the second semester.

No matter what are the factors, in all second semesters men get separated from the boys, the quality of our performance is tested, the tendency is to "let down."

I have no fears because I think there's enough determination to prove that integration is right.

I think there's enough determination to keep the separation of men from boys at an irreducible minimum.

I think there's enough determination to prove, that *this* second semester, there'll be no let down, but an upsurge instead.

I think there's enough determination in the First Class to keep themselves standing firmly at the helm, charting the course, right up to the time when they hold their diplomas in one hand and throw their hats in the air with the other.

NOEL A. MENARD,
Colonel, U. S. Army
Commandant

THE DOME

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EDITOR-IN-CHIEF Noel C. Koch
MANAGING EDITOR Carl R. Lobel
ASSOCIATE EDITORS

SPORTS EDITOR Art H. Dougherty, John Cimino
REPORTERS David Driscoll
Ed Fuller, Mel Blumberg,
Kirk Newsom

CARTOONIST Art H. Dougherty
LAY-OUT Tom Ogden
BUSINESS MANAGER Richard Hall
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Rick Kinney

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Prof. W. W. Fairweather

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An Internship in Engineering

Through Interdisciplinary Creative Projects

Reprinted from CONSULTING ENGINEER, November, 1965

A. T. Murphy, Ph.D., Professor and Director of Engineering

D. L. Wise, Ph.D., Assistant Professor of Engineering

Pennsylvania Military College

Most engineering schools now have included mathematics and science into their classical curricula to such an extent that they become essentially the engineering science programs initiated as separate departments some years ago. With this increase of math and science in today's engineering curricula, there has been a tendency to decrease engineering applications. This has produced a current concern among engineers advanced in the profession that our engineering graduates today lack the appreciation, let alone the desire, for the application of their knowledge.

In September 1962, Pennsylvania Military College, a small college of 1100 full-time students, of which 200 are engineering students, started on a completely new approach to undergraduate engineering education. PMC initiated an internship in engineering through interdisciplinary creative projects, upon the complete reorganization of its Engineering Division with eight new faculty members, including a new Director of Engineering. This "core" concept^{1,2} of engineering education is intended to give the student an engineering attitude, an experimental approach, and an appreciation of the limitation of theoretical models. The program is a realization that there is a set of basic subject matter that is common to all engineering disciplines. Thus, the PMC Engineering Division initiated a new curriculum taken by all engineers, with heavy emphasis on math and the physical and engineering sciences, for three of the four years required for the new B. S. in Engineering degree.³ In the fourth year, the student takes electives in a specialty such as chemical, civil, electrical, or mechanical engineering, with crossing of disciplines to suit the student's interest, under the guidance of an engineering faculty adviser.

To fulfill the goal of student internships in engineering through interdisciplinary creative projects, the faculty initiated a series of engineering problems and projects laboratories begun in the sophomore year and continuing through the senior year. The first in the series is engineering problems laboratory, a sophomore and junior course, which is interdisciplinary and treats lab problems on a short-term project basis. Students solve engineering-oriented problems which require the knowledge gained from theory courses. The students, generally working in small groups, are required to analyze the problem, determine the means for solving it, plan the laboratory attack, select the necessary equipment and instrumentation, perform tests, and draw conclusions. Problems are drawn from all fields of engineering and present situations which require the student to develop the ability to think for himself.

The first course given in the first semester of the sophomore year is intended to draw upon the student's background in physics, chemistry, and mathematics and to show the application of these sciences to engineering. The lack occurs before the student has had substantial courses in engineering and is intended to motivate him toward engineering, as well as to accomplish the laboratory aims.

For one typical sophomore engineering problem, a 1954 Cadillac was purchased for the students to determine its speed-ratio, traction, and torque. As one of the initial problems in engineering, it was of particular interest to take a familiar device and have the students obtain some concept of the areas of interest to engineers. Students found that by placing a traction dynamometer on the bumper and fixing the other end to a rigid wall that traction was a function of the

various surfaces under the tires. No classroom physics lecture on the coefficient of friction served the student as effectively as that test. The wheel speed was compared with engine speed using a stroboscope, which demonstrated system energy losses, as well as provided students with the use of another instrument. The sophomores had fun while beginning to learn to look for analytical means to answer how well a system performs.

Other sophomore problems included: measurement of muzzle velocity of a rifle; velocity and displacement measurement of a vibration shaker; measurement and computation of mass-moment of inertia and area-moment of inertia; and function evaluation and approximation on the digital computer.

The second and third engineering problems laboratories occur in the junior year and rely heavily upon the student's background (previous or concurrent) in the engineering core courses. Full-year courses drawn on largely are Systems Dynamics (Text: Shearer, Murphy & Richardson — *Introduction to Dynamic Systems*, to be published by Addison-Wesley Publishing Company), and Flow and Fields. No attempt is made at fixed subject matter coverage in these labs nor is any attempt made to cover completely all areas of interest in engineering in any one year. Of greater importance is the engineering attitude, experimental approach, and realization of the limitations of theoretical models.

As an example of a junior engineering problem, a modern direct energy conversion device — a thermoelectric cooler-generator — was available to students to measure fundamental parameters. The Seebeck and Peltier coefficients were to be measured and with this result the figure of merit, a function of the thermoelectric materials, was calculated. Students also calculated heat pumping rates of the device used as a cooler versus temperature difference for several values of current input. In addition to knowledge gained from a physics laboratory or instrumentation course experiment on a common thermocouple, the students showed an appreciation of the thermoelectric generator as a heat engine and as a heat pump.

For another problem, a ribbon of semiconductor material for demonstrating the Hall effect voltage was used by junior students to construct several novel instruments. To build a current multiplier, the student applied a current, considered as one signal, to a magnetizing coil and placed the semiconductor ribbon of material perpendicular to the magnetic field generated. The current through the semiconductor was the second signal. The resulting Hall effect voltage was then proportioned to the product of the two current input signals. The students were surprised to find that what appeared initially as a new sophisticated phenomenon could be put to such a simple and practical application.

Additional junior problems were as follows: compaction of soils; tolerances in electrical components; thermoelectricity; a.c. circuit analysis; non-linearity determination of contact deflections; transport dynamics of the spouted bed; performance of a d.c. motor; liquid-to-soil transitions; assumptions of the theory of beam bending; temperature measurements in an expanded gas system; moisture content and its relation to density of soils; equivalent networks; design and equivalent circuit of a transformer; beating in vibrating systems; equilibrium phase diagram for a cadmium-bismuth eutectic alloy; flow and field plotting on conducting paper; photoelastic deter-

mination of stress concentration at a circular hole; and thermodynamic study of an air blower unit.

In all labs, the problems are developed and assigned by the professor, who advises the students during a three to four week period of activity on that problem; thus the student will complete four problems each semester. There are no regularly scheduled lab hours for the junior problems laboratory. The students consult with the professor as needed in addition to regular meetings. The laboratories are open day and night, and the student team schedules its own work without detailed supervision. Problems are chosen so an average of six hours effort per student per week is required. Sophomores are given more guidance during a regularly scheduled three-hour session.

The interdisciplinary creative projects culminate in the senior year in a true internship with engineering projects. In this activity, teams of three to six students work closely with a "consulting engineer" professor for a year on a complete design and development project, which includes actual construction and testing in the laboratory. These design-oriented projects are in a wide spectrum of areas and generally are unsolved problems from current technology. Students must select and purchase their own equipment which includes giving details for specially-machined equipment or writing specifications for purchase orders for a somewhat unique apparatus where "in house" fabrication is impossible. A significant part of the student's effort is planning work schedules; that is planning what literature searches, analyses, and construction can be carried on while equipment is being procured. The professor, as a consulting engineer, recommends certain references, suggests the investigation of certain tests, and gives other advice. Scheduled weekly meetings, as well as impromptu ones facilitate the professor-student contact.

By completing selection of the senior projects before June, the students may, and are encouraged, to spend the summer in investigatory work. From September until August the students work on their projects in the lab, visit companies for assistance, and perform whatever is necessary to complete the design and construction-oriented projects. Project reports are due in April, followed by an oral presentation to the Engineering Division with local industry invited. The oral presentation has been run as an engineering seminar with an unbiased panel of qualified industrial judges. A significant benefit to the students has been the oral presentation alone. The written final reports, also judged by outsiders, offers another unique opportunity for presenting the students with a realistic engineering situation; that of writing clearly and concisely an overall project report that will be critically judged by their peers.

An example of a senior project recently completed is that of a real air pollution problem. local paper mill had an engineering estimate of \$19,000 for a SO₂ (sulfur trioxide) physical demisting installation of the type used in some sulfuric acid plants to eliminate irritation of the workers' eyes. The paper mill was uncertain as to the suitability of the installation. A cooperative agreement with PMC was made to give this actual air pollution problem to seniors for a project. The students first devised a method to produce a low concentration of SO₂ mist stimulating the plant gas. Analytical methods were perfected to measure the concentration of SO₂ in the total gas stream. Elements from commercial mist eliminators were evaluated, and

SO₂ cutdown efficiency was found to be poor. Literature evaluation and a field trip by the students to existing physical demister installations indicated that the proposed device was not applicable to the paper mill's situation because of the extremely low concentration of entrained particles.

Since some project time was still available, the students took a look at chemical means of elimination — even though this was beyond the original scope of the project. After testing several logical chemicals and packings, it was found that a spray of ammonium hydroxide in a column packed with marble chips eliminated the SO₂ air pollutant. An economic evaluation of a proposed new engineering design indicated a simple absorption tower with recycle could operate at \$25/day. The paper mill was quite pleased with the final report and indicated that the students had contributed importantly to its over-all operation by eliminating the fume problem.

With a more research-oriented project on fuel cells, the students made their own ion-exchange membrane from basic chemicals, platinized the electrodes, and totally built a fuel cell which operated at 75 percent efficiency. This project later resulted in a \$6250 National Science Foundation undergraduate research award for four students.

Brief descriptions of some of the other senior engineering projects, either recently completed or performed since the program's inception, follow: *Consolidation of fine-grained soils by sand drains* — High moisture content in soils presents a major problem to stabilization and eventual use of large land areas. With the increased need of this real estate, a novel method of consolidation of the soils by the installation of vertical sand drains has been introduced. Along with this new technique has come a number of engineering problems, each of which has been investigated: adequacy of existing design method; comparison of theoretical conclusions with actual behavior of an installation (by use of model analysis); and analysis of the effect of smear on effective sand drain diameter and spacing.

Emergency cardiac activity measurement — A device for use in emergency surgery was designed with the capability of picking up a weak heart signal and amplifying it so that an audible tone could be obtained. The device incorporates an amplifier to intensify incoming heart signals, an oscillator to obtain the desired audible frequency, and a trigger circuit to operate the oscillator.

Telemetry controlled bladder activator — Satisfactory voiding in paraplegic persons still remains an unsolved problem. A proposal for a surgically implantable electronic system in the body, controllable from an external electronic source, which produces normal voiding on command by the individual, was designed.

Shock tube — An electric shock tube was designed and built to produce shock front velocities up to ten Mach. Shocks are generated by fast discharge of capacitors into the driver section of the tube.

Ocean beach nourishment — A room size model for studying the replenishing of sand to beach areas was constructed. Main points investigated were optimum distribution procedures of dredged sand to the beach and design of submerged dredge line to shore.

Go-in-ice-and-snow — A test rig was designed, built, and used to test the degree of traction obtainable by several devices attached to automobile tires when in contact with simulated ice or snow conditions.

Automatic garage door opener — An inexpensive device was designed and constructed for opening and closing a garage door. Since automatic garage door openers are presently on the market the essence of this project was to accomplish the objective in a simple cheaper manner. An analysis was presented indicating the relative lower cost of this device compared to commercially available ones. The feasibility of the design was demonstrated by a working prototype.

Electronic number reader — A study was completed on the logical, optical, and circuit requirements necessary to implement an optical reader. Portions of a flying spot scanning system were designed, fabricated, and tested. The logical requirements in the system were developed and included shift registers, associative memory, and control networks. Evaluation showed the system could meet the requirements satisfactorily but that the flying spot scanning imposed many restrictions which must be overcome before the entire device could be designed and fabricated.

Cement-mortar bond test — There is a need for a standard test method for determining the bond strength between mortar and masonry units. Such a test method was developed. This required the design and construction of a suitable test frame. Results on bond strengths were determined under various conditions. The procedure is suitable for investigating properties of various inorganic cementing materials.

Subsonic wind tunnel — A 250-mph wind tunnel with a 1' diameter throat was designed and constructed. Plans were developed for instrumentation and control to study flow around oscillating and rotating bodies.

True north seeking device — This group investigated the feasibility of using the oriolis acceleration effect due to the rotation of the earth as a means for developing a true north seeking device. The conclusion was that it was not presently feasible due to the need for precise measurements of small effects.

Curb-inlet catch basin grating design — A curb-inlet catch basin resting in a typical street intersection was designed and constructed. Several grates were designed and their capabilities tested against varying flow conditions of quantity and velocity. The designs investigated included various geometrical arrangements and resulted in an optimization of traditional storm drainage structures.

Matrix for stereo-multiplexing — A new matrix for FM stereo broadcasting and receiving was developed. This unit does away with the complicated units presently in use involving a number of vacuum tubes or transformer. It is much cheaper than the present units and equally good in performance.

Flame tube studies — A combustion tube was constructed to investigate transient and nontransient uniform flame fields. The tube was designed with all attending measurement equipment; the stainless steel tube was built upon a metal frame, then placed upon a concrete pad and enclosed by three concrete block walls. This tube was fired four times with acetylene gas fuel and resultant combustions were observed.

Multiplier for analog computer — A function multiplier was designed and constructed for use with the Heath-Kit Analog Computer. The principle used is pulse time division.

A model analysis of seepage pressure under dams — To compute the seepage pressure under a specific dam, a model of the dam and its foundation was constructed. Flow lines were made visible by means of dye patterns and pressures were measured at selected points. Equipotential lines were analyzed and thereby provided a graphical solution of Laplace's Equation, satisfying all required boundary conditions.

A new system for TV audio — A system of pulse-amplitude modulation using the already available horizontal

(Continued on Page 6)

SCIENCE AND ENGINEERING

ENGINEERING AND THE ENGINEER, A DUAL CHANGE

by Mel Blumberg

Dome Staff Writer

"Civilization as we know it owes its existence to the engineers. These men who, down the long centuries, have learned to exploit the properties of matter and the sources of power for the benefit of mankind. By an

organized rational effort to use the material world around them, engineers devised the myriad comforts and conveniences that mark the difference between our lives and those of our forefathers thousands of years ago."

Whether one agrees with these words of L. Sprague de Camp, or look

upon them as the babblings of a fool, he cannot deny that if our civilization were suddenly deprived of the results of engineering endeavor we would suffer the immediate consequence of being naked, hungry, and afoot in a harsh world.

The engineer has been praised for his affluence, ridiculed for his literacy,

and damned for his arrogance; yet recent polls show that the public image of the engineer is second only to that of the physician, and it has been acknowledged that engineering will be considered to be the most learned profession within the next 50 years.

An engineer is one who uses a knowledge of mathematics and science

to apply the forces and materials of nature for the benefit of mankind. In the past, the engineer has confined his talents strictly to the solution of technical problems, often with success, while at the same time the larger economics, political, and social aspects doomed a project to failure. The engineer who invents a better mousetrap may well find that he has driven a whole generation of cats into poverty and unemployment.

Practically every large new engineering problem also involves a social problem. The atomic bomb, the automobile, the printing press, the compass, gunpowder all involve engineering problems which have been solved, or which can be solved. The social problems which these advances generated have in some cases not even been completely defined.

In a recent interview, Dr. Arthur T. Murphy, Director of Engineering at PMC, stated that the role of the engineer is becoming increasingly important as our world becomes more mechanized. Dr. Murphy pointed out that the engineer is in a unique position to solve many of the problems of our time because he has the technical knowledge required to weigh the ramifications of technological advances. He added that one skilled in the engineering approach oriented version of deductive reasoning, has the framework or scheme of values against which to cast and evaluate the needed decision.

Dr. Murphy stressed that the traditional role of the engineer is changing from that of one who merely provides the hardware to do a job, to that of active participation in policy making decisions. The engineer is found more and more in the top management positions of government and private corporations. Dr. Murphy also mentioned that among the most pressing socio-engineering problems are air traffic safety, water and air pollution, and mass transportation.

The airline passenger may be put down half a continent away from his intended destination in the event of

(Continued on Page 6)

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Sideline Observation

... From DAVE DRISCOLL

Sports Editor

Down Goes The Averages So Johnny Can Play

Several columns ago I made the comment that the PMC Frosh basketball team would be a big asset next season, providing that poor grades were not their downfall, a common thing to many Freshmen. Well, it did happen; and after final exams were over, Frosh Coach Stan Freedman found himself with only two out of his ten players eligible. Moreover, the Varsity hoopsters learned that one of their top stars was also in the same fix, not to mention several top wrestlers. The winter sports program was going bad enough without this happening.

What the administration has done to remedy the situation is lower the eligibility average to a 1.00, stipulating at the same time that a person who has an average below his minimum required graduation average must obtain permission from his department head if he wants to play a sport at PMC. This seems fair enough. However, I can now see the plight of an athlete who has a department head who abhors sports. The poor athlete will run himself crazy trying to get into another curriculum. It would be a lot easier if the athlete applied himself to his studies and kept his grades where they should be.

The lowering of the eligibility average could also be the start of something bad. The emphasis on sports, especially when the new athletic complex is built, may reach a fever pitch, and after four years an athlete could find himself with a certificate of attendance instead of a diploma from PMC.

It has been proven before that a person can excel not only in athletics but also in his academics. And if a person enters college with just the thought of doing well in sports, and letting his studies "just get by," then he is not only hurting himself and his chances of success in later life, but also he is defeating the purpose of the college. Remember, it is education first, athletics second.

* * *

Skip Dougherty, cross-country coach, swimming coach, and assistant track coach, left behind three vacancies that will be hard to fill. In three years of coaching cross-country, his team compiled an amazing 30-6 record, in track as assistant to Coach George Hansell, PMC compiled a 14-8-1 record and won the MAC crown last year. He was half-way through a fairly successful swimming season when the Army called. In CC and in track, he always lead the work-outs himself, pitting age against youth and usually winning. He had the rare ability to inspire his runners to give their best in every race, and they always did...

Ken Elliot is a welcome asset to the PMC basketball team. Ken, a transfer from Delaware, was forced to sit out the first half of the season because of transfer ineligibility. In his first game, he contributed 14 points to the winning cause against Muhlenberg, and after four games is averaging 12.3 points per game...

Charlie French, a Sophomore, is a versatile athlete. He began the Fall season on the cross-country team. When injuries plagued the football team, Coach Raimo called for, and got, Charlie as a reserve back.

When the football season was over, French began running in preparation for track (his best sport). An emergency call from Coach Harold Sveinbjornsson of the wrestling team brought French onto the mats. In his first varsity match he defeated his opponent from Brooklyn Poly by a pin. He'll finish out the season with the team, and in the meantime continue running in preparation for the coming track season. Oh yes, and his average is over 2.00...

The annual Cross-country — Swimming Banquet was held on February 8th in MacMorland Center. The respective teams elected captains for the 1966-67 season. In Cross-country they are Charles McCoy and William Craemer, and in swimming, Bill Van Pelt and Ed Kijewski.

Dave Irons was awarded the Dougherty-Tasket Trophy for Cross-Country. To be eligible for this award a runner must place in the top three in all races run during the regular season. Other Cross-country trophies were awarded to Dave Driscoll, Mike Kormanicki, Mike Stakus, and Harry Lutz.

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ATHLETICS

Hoopsters And Wrestlers Are Plagued By Haverford

Swimmers Win Two

Cagers Are Now 4-2 Wrestlers Pin Poly

BASKETBALL SCOREBOARD

The PMC Varsity opened their Febraury campaign with two victories before their past record caught up with them. The Cadets blew a 15 point lead to Muhlenberg and then needed an overtime to come out on top, 68-64.

Win number four came in Hyatt Armory as Shicora, LaFlamme, and Arbogast combined for 48 points to lead PMC to a comparatively easy triumph over Eastern Baptist, 75-58.

PMC almost pulled an upset against Ursinus College as they did earlier in the season, but twenty-six fouls against the Bears provided the winning margin even though the Cadets had outscored Ursinus in field goals, 31-27.

Haverford College led all the way in their contest with the Cadet hoopsters. PMC pulled to within seven with six minutes left to play in the half, but the Fords super-star, Hunter Rawlings, dumped in four straight baskets and Haverford coasted to a 13 point half-time lead. At the start of the second half, the Cadets defense withered as the Fords ripped the cords with 13 points in the first five minutes of play. PMC could only manage five and went out to lose, 80-62.

FRESHMAN BASKETBALL

The Plebe basketball team improved its record to 9-4 last Saturday night at the expense of Haverford. The Plebes were outscored from the field, but shot 75% from the foul line to cap victory number nine, 83-70.

Three nights earlier Coach Stan Freedman's charges rolled over the Eastern Baptist JV, 102-63. This was the highest score seen in Hyatt Armory in some time.

Right now, the two leading scorers for the plebes are Skip McCauley with an 18.3 average, and Joe Linsay with a 17.5 average per game.

A surprising newcomer to the Plebe team is Tom Finnegan who dumped in 21 points against Baptist and 15 against Ursinus.

Fitting Tirbute To Swim Coach

The PMC tankers gave Army-bound Coach, Skip Dougherty a fitting going-away present with a 63-39 victory over Brooklyn Poly. Ed Kijewski, Harry Lutz, and Bill Van Pelt each won two events and were members of the winning 400 Medley Relay.

The following week, the "Nads" made Coach Dan Horninger's debut a success as they dunked Wilkes College, 64-31, and evened their record at 4-4. Once again the scoring punch was shared by Kijewski, Lutz and Van Pelt as they repeated their performance from the previous week. Other individual winners in the meet (in which the Cadets won 9 of 11 events) were Bill Baum in the diving and Jeff Feiser in the 50 freestyle.

"... the Great Society is not a safe harbor, a resting place, a final objective, a finished work. It is a challenge constantly renewed, beckoning us toward a destiny where the meaning of our lives matches the marvelous products of our labor."

—Lyndon B. Johnson

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The PMC wrestling squad finally came through with their first win of the season over Brooklyn Poly, 23-15, even though they were forced to forfeit two matches. The Cadets won six matches, five of them by pins.

Charlie Clauss recorded one of the fastest pins on PMC record as he vanquished his opponent in 40 seconds of the first period. The collegiate record is 28 seconds, set in 1957 by Den Hodge of Oklahoma.

Haverford College won the first five matches, two by forfeit, before the Cadets could get on the scoreboard. Pins by John Brenner, Charlie Clauss, and John Peterson, plus a 4-0 decision win by Jim Miller were not quite enough as the Fords won, 25-18.

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An Internship in Engineering

(Continued from Page 3)

by a generous contributions to the This system does away with the normal FM audio signal and incorporates the audio information as part of the picture signal.

Isometric exercise devices — The theory of isometric contraction is to use the muscles trying to move an immovable bar or other objects. The problem thus arises how to measure strength before and after a training period. The purpose of this project was to design and build a device to measure the muscle power of an athlete so that a comparison might be made between his strength at the beginning of his training and at different periods during his training. A number of devices were proposed and constructed. **A process for producing high surface area particles** — A single processing step was developed and investigated for increasing surface area of raw material particles by forcing the particle slurry through a nozzle under high pressure into the atmosphere. The difference in pressure from nozzle to atmosphere is large enough that volatiles within the particle (absorbed

water) flashes off, thus rupturing and expanding particles in a manner similar to puffed wheat and rice "shot from guns."

The interest of senior students in their projects has been tremendous and some real progress in certain areas of engineering has been made. Several patents are being applied for, several industrial companies have paid to sponsor projects of immediate interest to them this year as a result of knowing the type of work done last year, and additional companies have indicated interest in next year's projects.

The students have truly had a unique internship in engineering through interdisciplinary creative projects. With three years of operation of the new curriculum, it is still too early to have accurate feedback from job performance of students having had sophomore and junior problems laboratories and senior projects. However, the faculty believes the program will contribute heavily to the future development of these engineering graduates.

WILLIAM PENN JOHN MORTON

(Continued from Page 1)

was born about 1724 in Ridley, Pennsylvania. A surveyor and a cultivator of the family farm in Delaware County, he served almost continuously as a member of the Colonial General Assembly of Pennsylvania. Morton was one of this state's delegates to the Stamp Act Congress (1765) and a member of the Continental congresses from 1774 to 1777.

In July, 1776, he joined Benjamin Franklin and James Wilson in casting the votes that placed Pennsylvania in favor of independence, by a slim majority of one vote. He subsequently signed the Declaration.

Morton also served as chairman of the committee to adopt the Articles of Confederation which were ratified shortly after his death in April, 1777.

English Club

(Continued from Page 1)

moting the contest, has set five days of semi-final tryouts beginning on Monday, February 21. A group of representatives from the English Club will choose the finalists from these tryouts. The time and place of the semi-finals will be posted on bulletin boards throughout the campus along with a bibliographical list of possible sources on the topic.

The panel of judges on the eve of the contest will consist of five Faculty members whose names will be disclosed at a later date.

The affair is being made possible by a generous contribution to the English Club from Dr. Mervin Lowe, Professor of English. All members of the English Club are excluded from participation in the contest.

PRESIDENT

(Continued from Page 2)

privilege of a term to adjust and that final accounting will be made at the end of the year. For others, the procedure is less generous, but is, to a large degree, the same. But then comes May when everyone pays the piper, and those who are without resources find themselves rejected. In short, each of you who has had a weak record last semester and has been permitted to continue into this one has a one-semester reprieve to bring this record into good order, or you will find yourself in that precarious position where the academic office may be calling your association with PMC terminal. Conditions nationally are such that colleges alone will not be the only force controlling your college continuity.

For each of you whose record has been less than satisfactory, this is the one time when your resolutions to improve had better be real, for if they are not, they will, in all likelihood, be the last such resolutions for some time to come.

Engineers

(Continued from Page 4)

bad weather, or his charred remains may be found scattered across several city blocks should mechanical difficulty occur.

A large city rations water because there is not sufficient supply to satisfy needs during a day in summer.

People on earth are multiplying at a rate such that we shall one day run out of food to give them and places to put them.

These are all engineering problems, but are at the same time social problems. They can best be solved by the liberally educated engineer who is ideally situated to communicate with those having specific technical knowledge on the one hand, and to weigh the values specified by the humanist on the other. This will be the person who straddles the so-called gap between the two cultures.

Those responsible for engineering education recognize that a person who knows only his own specialty, and has not devoted a large amount of time to the humanities and social sciences will have no sound basis for evaluating the world around him. For this reason student engineers presently devote nearly 20 per cent of their time to the study of these subjects.

Engineers of the future will be using technologies which do not now exist and applying fundamental laws of nature which have yet to be discovered by the 'pure scientists' — the physicist, the chemist, the mathematician, the philosopher, and the poet.

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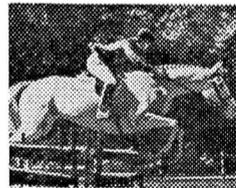
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