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IN THIS ISSUE

Those who want to know how to beat the “establishment” should be interested in Jim Brown’s article on page 12.

Courtesy of William N. Hursta, the Technic presents an analysis of short term oxygen demand on the Arthur Respirometer.

Any Rose student who wants an unprejudiced opinion of his college should enjoy the Hyde Report on page 20.

COVER NOTE: This month’s cover suggests some of the student activities across the nation related to Jim Brown’s article on page 12. Art work is by senior electrical, Jim Coles.
In Memorium: Denny Randle

By Way of the People

By Way of the People

Arthur Respirometer

William N. Hursta

The Hyde Report

Dr. Hyde

* * * * *

In Loco Parentis

Miss Technic

SPORTS

Sly Droolings

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PHYSICS
In Memorium

Denny Randle

Character, scholarship, leadership, are words that are often misunderstood and almost continuously overworked. They are qualities that are not easily described by words, nor are they as common as some people believe. Each in itself is unusual and the combination of the three is even more difficult to find. Whenever a man exhibits this rare combination of qualities his peers are quick to recognize his abilities and usually find some way to honor him.

Denny Randle's tragically short life seems to be best summed up by reviewing the various honors bestowed upon him. Denny came to Rose after four years in the seminary and one year at Southern Illinois University. At SIU Denny played catcher on the freshman baseball team. While at Rose Denny was very active in intramural sports, for the dormitory teams during his freshman year and for fraternity teams in later years.

During his freshman year Denny began working on various Technic staffs while at the same time marching with the Rose Rifles. In January of his freshman year he was pledged to Alpha Tau Omega. Denny was a very active member of the pledge class and at the end of pledgeship he was selected as the Outstanding Pledge by the active chapter.

Sophomore year found Denny continuing his activities both on campus and in the fraternity. While busy with the Technic and intramural sports he still found time to serve as a substitute cheerleader at many of the ball games. He also served on fraternity homecoming and rush committees. In the spring of sophomore year he was elected as Worthy Usher by Alpha Tau Omega. The job entailed participating in the executive council decisions made by the chapter, and serving on many of the chapter committees.

During the fall quarter of his junior year Denny was tapped for Blue Key National Honor fraternity. Chapter activities found him serving again as a homecoming committee chairman and assistant rush chairman. In the spring he was appointed editor of the Technic and was also selected to serve as rush chairman for the coming year.

On September 5 Denny's short, full life came to an end. Denny was electrocuted while doing surveying work after returning from ROTC camp. His younger brother, Warren, was badly burned in the same accident.

It is hard to accept the loss of a man so young and so full of life but I cannot help thinking that those of us who had the privilege of knowing and working with Denny are better men because of our contact with him. Character, scholarship, and leadership are words that fit him easily. He was a leader, he was a good student, and he had a depth of character that is not found very often. But for those of us who were very close to Denny, especially the men in his pledge class, it was more than the loss of an outstanding student. He was very close to many of us and his death was a deep personal tragedy. It is not easy to describe what his loss means to each of us personally, but to all of us Denny was a friend and he will be missed.

Joe Tomlinson
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Not very long ago college students were seen and not heard. But in the quiet and complacent 1950's there was little controversy to stimulate their interest and involvement. The major political and social problems were not of direct concern to the student. Lacking confrontation with debatable issues, there was little responsibility placed on the student, so he was content to allow the school to control his life as had his parents during adolescence.

With the new decade of the 1960's the youth of America were suddenly shocked from their complacency by several new developments—especially racial crises and the war in Viet Nam. Young Americans, more idealistic and sensitive than their elders, began to realize the need for action to eradicate the abomination of racial injustice. Unlike their parents, who had grown to "accept" secondary citizenship, young blacks were ready to take action to achieve their rightful status in American society.

The question of the morality of the war in Viet Nam fell most heavily on the young, because it was they who were drafted and had to fight the war. Military service in time of such a war took on much deeper significance than it had in the peaceful years before.

A further contribution to the change in student attitudes can be attributed to a difference in their upbringing. Many of their mothers had raised them holding a baby bottle in one hand while reading Dr. Speck in the other. A decrease in emphasis on physical punishment led to an erosion of the fear of authority. This new permissiveness led this generation to question authority rather than comply blindly. The simultaneous appearance of this attitude toward authority and the moral problems of race relations and war explain the basis of current student unrest. Like it or not, school administrators are faced with a new "uppity" generation, demanding a voice in the decisions that affect their future. Denying their requests completely would be as practical as returning to slavery to solve the race problem.

Fortunately for Rose students, the administration is recognizing the need for some changes to realign the student-institute relations. New channels are becoming available for communication and action between students and administration. The success of the new approach will depend greatly on the willingness of the students to accept the responsibility and exhibit the maturity necessary to make the new role of the student a practical reality. If we students can rise to the challenge, we will graduate from Rose far better prepared to meet the problems of the real modern world.

A.J.T.
What company was responsible for the following engineering innovations?

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We hope the above final can be the start of something great.
The Way of The People

By JIM BROWN

In recent weeks Rose Polytechnic Institute has been faced with a problem that has become prominent on campuses throughout the United States and the world. Certain students, in their capacity as free individuals, have questioned the policies and traditions which are present on campuses; and they have, in some cases, rejected these rules.

Up to this point there is very little reason for concern. However, at this point, through a myriad of methods, students have begun to raise havoc, confusion, and chaos. They have forced students and faculty members to reevaluate the rules, and in many cases have changed these rules. Nevertheless, in many other cases these methods have caused nothing but misery and grief, and these dissenting students have acquired a bad name for all dissenters.

What are the methods which students are using to protest? Basically, the methods can be classified into seven non-violent categories:

1. Pacifism
2. Non-resistance
3. Non-violent direct action
4. Civil disobedience
5. Non-violent coercion
6. Non-violence by necessity
7. Violence without hate

It is not necessary to consider violent action because of the obvious bad image it will carry with it. However, the above listed methods are all serious possibilities for dissenting. These methods are being used today on campuses everywhere. Civil disobedience, however, is the method which is the most important and with which this article will be concerned. Civil disobedience lies in the middle of the list. It is the most predominant non-violent method in use, and it is very applicable to the Rose Campus. Before delving into applications, it is necessary to have an understanding of the characteristics of civil disobedience (and certain definitions).

Civil disobedience can be defined as the non-violent disobedience of a specific law of the state having jurisdiction over the protestor. There are certain points which should be stressed here: 1) It is against the State (the governing body) thus, the use of the term "civil". 2) It is an intentional act. 3) It is used to call attention to a certain rule believed unjust. 4) It is non-violent. 5) It is used by those who cannot exert the necessary power. Thus, the person who disobeys this law makes it perfectly clear to anyone concerned (even to the extent of telling the state). The dissenter hopes he will attract enough attention for people to take notice of the rule concerned. Then, theoretically, people will support him by also disobeying the law, putting pressure on officials, and employing other means of law amending. The dissenter has thus changed the law, and he has been hurt in no way—except for a possible reprimand from the State.

Theoretically, this all sounds very good. In practice, there are many flaws. First, and most important, the people may not agree that the rule is bad. This reaction puts the dissenting student in a very embarrassing position. He is now just a lawbreaker. Secondly, the State may not believe that he should be given a mere reprimand. He is now a punished lawbreaker. Thirdly, the people may not recognize civil disobedience as a correct procedure. He is now an unorthodox, punished lawbreaker. Finally, he may not be able to be protected under the First Amendment. This would make him an unorthodox, punished, lawbreaking Communist hippie!! Quite a change from a free, individual American reformer.

The preceding paragraph was merely to show the flaws of this dissenting method. It was not meant to be a true evaluation of civil disobedience. In fact, civil disobedience works in many cases. Think of the stir it has caused concerning Vietnam and racism. How can civil disobedience be applicable to Rose? Three examples will be cited: 1) traditions 2) Honor System 3) grading system. First, suppose that an underclassman believes that beards should be for everyone. In a process of civil disobedience he might 1) contact the seniors and tell them he has a beard and where he will be at a certain time 2) send out letters to other underclassmen urging them to grow beards, but not to interfere in the seniors' attempt to shave them. Thus, if there are enough underclassmen growing beards, the problem will be brought to light and seniors will be forced to reconsider their position.

In regard to the honor system, the student may merely tell his professor that he refuses to report a student cheating. The professor may punish him, but if the student can obtain some backing the professor will be forced to reevaluate the system.

Finally, if a student believes that there is an unfair grading system at Rose, he could refuse to turn in a paper. Again, he will need backing. It should be noted that the above procedure would require more than just a majority of the students in a class. Moreover, they would require the wholehearted support of the entire student body—a goal hard to achieve.

Civil disobedience is an excellent method for the people to express their opinion. However, it should be emphasized that the method should not be overused. If people were to use the method anytime they were displeased, the jails would be full.
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INTRODUCTION:

Water pollution is becoming one of the major problems facing this country today. In solving this problem and effecting control of the wastes poured daily into our rivers and streams the ability to accurately determine the amount of sewage in waste water is vital. When dealing with pollution resulting from organic materials, the biochemical oxygen demand (BOD) test is the standard used to rate the strength of the waste. The BOD test attempts to simulate the oxygen uptake of microorganisms in polluted waters. This uptake is the result of the organisms utilizing the decomposable organic substrate present. The magnitude of oxygen demand is considered to be indicative of the amount of organic matter. In brief, the test consists of diluting a sample of sewage with distilled water which has had nutrients and buffer added to it. The initial concentration of dissolved oxygen is determined and the diluted sample then incubated for five days at a temperature of 20° C. After this period the concentration of dissolved oxygen is again measured. The following formula is then used to calculate the BOD value for the sample.

\[
\text{BOD} = \frac{\text{D.O. (initial)} - \text{D.O. (final)}}{\% \text{ dilution}}
\]

When the BOD test was first developed, it was found to give an oxygen depletion curve, from which it could be seen the time span is approximately thirty days. The progressive exertion of BOD can be divided into two distinct stages: a first stage during which carbonaceous matter is the predominately oxidized substrate and a second stage during which nitrogenous matter is oxidized. The carbonaceous stage can last anywhere from ten to twenty days before the nitrogenous stage appears. After a protracted period of time oxygen uptake becomes minimal and fairly constant. Uptake never goes to zero due to endogenous respiration.

The first equation to fit the BOD curve was proposed by Theriault in 1926. This was the equation of a first order or "molomolecular" chemical reaction, i.e., the rate of the biochemical oxidation of organic matter is directly proportional to the amount of unoxidized organic matter remaining. In differential form

\[
\frac{dy}{dt} = k(L - y)
\]

Integrating this gives

\[
y = L(1 - e^{-kt})
\]

where \(y\) is the oxygen demand at any time \(t\), \(L\) is the ultimate oxygen demand, and \(k\) is the reaction velocity constant. Any practical use of this equation is limited by the fact that \(L\) and \(k\) are usually unknown and have to be determined by experiment. Considerable effort has been expended in developing ways to find the value of these constants. Among the techniques used are the Reed-Theriault Method, Fair's Log-Difference Method, the Slope Method of Thomas, the Two-Point Method of Rhamse, and the most popular Method of Moments of Moore et. al. Several factors influence the value of \(L\) and \(k\) which should be noted. There are temperature, type of sewage, and the number of days used to calculate the BOD.

Other attempts have been made to find different equations which would give a better fit to the BOD curve. A logarithmic equation was offered by Orford and Ingram of the form

\[
y = S(M\log(at) + B)
\]

where \(Y\) is the oxygen demand at any time \(t\), \(S\) is the oxygen demand of the plotted data at 5/\(a\) days, \(M\) and \(B\) are rate parameters, and the constant \(a\) is the 5-day BOD value that would have been obtained at standardized domestic sewage rates. \(M\) and \(B\) are also defined in terms of a domestic sewage. As might be surmised this represented very little improvement in terms of useability over the first order reaction equation.

A second order reaction equation for the BOD curve has been proposed fairly recently by Young, et. al., and Revelle, et. al. Young et. al. set forth the equation in the form of

\[
y = a + bt
\]

where \(y\) is the oxygen demand at any time \(t\), the inverse of \(a\) was the rate constant and the inverse of \(b\) was the ultimate BOD. This was strictly an empirical fit and no theoretical explanation was offered.

Revelle et. al. developed the second order reaction equation from a more theoretical base in effort to provide a more reasonable explanation of BOD characteristics. It was assumed that the rate of BOD removal was proportional to both the concentration of unoxidized organic material and the concentration of bacteria. Thus

(Continued on page 22)
But the rest of the week you really won’t want to. We hope. How come? We’ll give you every chance to be so busy, so challenged, so involved that you’ll look forward to each day. We’ll give you every opportunity to accomplish something. And then get credit for it. That’s what we really offer. In marketing, refining, planning and engineering, research and development, or administration. Is there something better? Don’t sleep on it. Talk to our representative on your campus. See our ad on the next page for the date.

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Miss Mary Lou Sheldon is our honorable and beautiful Miss Technic for this fall. A sophomore at Indiana State University, Mary Lou reveals her patient nature by her choice of curriculum, Elementary Education. A member of Chi Omega Sorority, Miss Sheldon was also honored with the title Miss Hammond 1968. Standing 5’2” on tiptoes, Mary Lou was endowed with dark brown hair and hazel eyes.
Mondays never look the same to Bob Byse

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A VIEW OF CONDITIONS AT ROSE

Editor's Note: Dr. Melvin Hyde, former president of Evansville University, visited Rose Polytechnic Institute last spring and submitted an evaluation of this school. This confidential report was undertaken for the personal use of Dr. Logan. Dr. Logan very generously agreed to release certain portions of this report to the editors of the Technic. We would like to personally thank Dr. Logan for allowing us to print the following excerpts.

Periodically it is important for educators to ask the questions: "Which colleges and universities are the most valuable for our time? Which ones are providing training and leadership for our society?" At the outset of this report to the President of Rose Polytechnic Institute I wish to say that our colleges must be ready to consider changes, innovations, and new ideas. I firmly believe that the schools most valuable for our time and providing leadership for our society are the ones which are not remaining in isolation from the real needs and problems of society. It is not the ones with excessive traditionalism and inflexibilities characteristic of some schools in our nation. I truly believe the institution that will serve and prosper in the future will be the college that shows flexibility, is willing to adjust its courses and procedures from time to time, and is anxious to develop programs for the betterment of the world in which we live. This college we are talking about must plan its future within the framework of society's demands both now and in the future.

It is not necessary for me to say that Rose Polytechnic Institute during its almost one hundred years of existence has had some dedicated leaders and friends who have given a great deal of their life and substance that this private School might exist and serve young men desiring a quality engineering training. The standards have been high despite rising costs, limited endowment and state-school competition. I am able to say there have been a measure of flexibility throughout the years in the developing curriculum. Likewise one can see other changes, improvements, innovations and new ideas—an excellent example is the new program (one of the first in the country) in Biological Engineering. There is always some room for more improvement and certain suggestions will be made in this report.

That the School has through its President asked me to spend two weeks in unhampered consultation with students, teachers, trustees, and administrators is evidence of the desire for critical appraisal and institutional improvement.

During the visit I had opportunity for extended conferences with the President, Vice-President, Dean of the Faculty, Registrar, Director of Research, Director of the Library, Director for Development, Director of Admissions and Placement, Business Manager, Dean of Students, Social Director of the Union, and Director of Dormitories, Department Heads, several faculty members, several Trustees, President and other officers of the Student Body, about fifteen presidents and heads of various organizations, and many individual students (approximately 100-125). I participated in a Blue Key initiation and installation, and spoke before the Board of Associates of the School.

Faculty
Rose Polytechnic Institute has an excellent community of teaching scholars. While emphasis is placed on teaching rather than research, some of the latter takes place. A measure of basic encouragement in research is given; however, because of basic philosophy and budget, the output is minimal. The offering of limited Master's work and the discussion concerning a possible Doctoral program point to certain campus thinking. It is thought (by a number of the staff members) that a graduate program of modest proportion would be valuable for students and faculty and would make a genuine contribution toward achieving the Institute's goal.

In recent years the faculty turnover has been approximately 15%. This is a little high. I cannot put my finger on any general reason for the higher percentage. I do not believe it is salary. There may have been a few questionable appointments. Some of those leaving are going to a campus where there is less specialization. A few of the younger faculty members indicate that "The younger staff feels stifled by the old timers". I am not able to evaluate this comment.
Between 50% and 60% of the teaching staff hold the earned doctorate. This is above the 35% average for many liberal arts colleges and probably a little lower than departments of Engineering in some of the State Universities and larger Schools of Engineering; it is, however, a very commendable percentage.

There is a feeling on the part of several key staff members that there is a genuine need for better teaching methods. This is the comment: “Despite all our efforts to emphasize and reward good teaching much instruction is uninspired and performed by rote. Some formal program of indoctrination might help but older faculty members need ‘refurbishing’ as much as new ones.”

**Students**

In most respects the students are quite happy at Rose Polytechnic Institute. They like their fellow students, most of their teachers, the excellent food service and the attractive campus. These young men are bright, courteous and friendly, and appear to have a high measure of purposeful outlook in their future planning.

It should be said, however, that the students at Rose are questioning policies, asking for a voice in decision making and seeking certain “reforms” as they are doing on many other American campuses today. The School would be very wise to accept more participation and assistance from students without delay, before problems of serious proportion arise. The so called “communication gap” between students and faculty exists here in considerable degree. Present student membership on faculty committees is nominal and rather ineffective. Often the committees do not meet or students are not notified when they do meet. The feeling is very general on the part of many students that the faculty and administration believe they know best on all matters. The students speak of the usual faculty attitude: “This is the way we have always done it”. Several able student leaders further described faculty procedure with them as “one of delay, conservative response, and lack of sympathy; about five old timer faculty members run the faculty and the rest follow”.

---

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Anyone interested in working on one of the Technic staffs may contact us through Box 283 Campus Mail
OXYGEN DEMAND
(Continued from page 14)

Since neither a first order or second order reaction equation can be justified in terms of molecularity or by methods of chemical kinetics due to the complexity of biochemical oxidation, the exponents m and n are assumed to be 1 to facilitate the mathematics. Therefore

\[ \frac{dy}{dt} = k_1(q) \cdot (k_2 - k_L y) \]  

(8)

or

\[ \frac{dy}{dt} = k_1(q) \cdot (L - y) \]  

(9)

where \( q \) = concentration of bacteria

\( y \) = oxygen uptake at time \( t \)

\( k_1 \) = rate of substrate removal

\( k_2 \) = constant of proportionality

\( k_L \) = the initial concentration of substrate

\( L \) = ultimate oxygen demand

\( B \) = initial concentration of bacteria

\( k_3 \) = constant of proportionality

Then

\[ q = k_3 k_4 (y + b) \]  

(10)

where \( B \) = initial concentration of bacteria

\( k_4 \) = constant of proportionality

Substituting back into equation (8) and combining constants gives

\[ \frac{dy}{dt} = k(y + b) (L - y) \]  

(12)

Solving for \( y \)

\[ y = \frac{L - b + L}{b/L C K (L + b) t} \]  

(13)

This equation is slightly more complex than equation (5) but was found to give an excellent fit in the lag phase of early BOD exertion and in the region of rapid oxygen uptake. Deviation from the calculated curve by the experimental data was attributed to bacteria die-away which follows the attainment of maximum population.

The oxygen demand curves to be examined in this paper were obtained under conditions which are radically different from those of the standard 5-day BOD test. With the Arthur Respirometer (AR) a dynamic situation is created where maximal growth of bacteria is encouraged. Therefore, although standard BOD data aids in giving some insight into what is occurring, there is not necessarily a definite relationship between them.

EXPERIMENTAL APPARATUS:

As has been previously mentioned a prototype model of the Arthur Respirometer was used to obtain the oxygen demand curves. This machine has been fully described in the literature. Briefly, the instrument operates in the following manner. A one liter sewage sample is placed in a closed system where air and water is constantly recirculated countercurrently through the sample. Continuous agitation and thorough mixing of the sample results from the recirculation. Respired carbon dioxide is absorbed from the system. Therefore as the oxygen is utilized by the bacteria the pressure is lowered in the system. This pressure change is sensed by a transducer and fed into a strip chart recorder. The recorder then provides a continuous record of the oxygen uptake. Temperature change during the run was found to be small (2 to 3°C.) and therefore considered to be insignificant. The magnitude of the system temperature was 25°C.

EXPERIMENTAL PROCEDURE:

A standard 5-day BOD was run on the test sample before it was placed in the respirometer and again after the test run was completed. After a series of test runs the strip chart recordings were grouped according to the initial 5-day BOD of the test sample and the machine in which it was run. There groupings were then transferred on to a single strip chart graph designated as a master graph. This facilitated working with the data and allowed easy comparison of the individual graphs by visual means.

Each uptake curve was then considered separately. Points on the curve were picked off at hourly intervals and by method of least squares a line of best fit was searched for. An 1130 IBM computer was used to do this. Five different equation classifications were considered — linear, quadratic, exponential, logarithmic, and power. The standard deviation of the data from each of these different equation types was used as the measure of best fit.

DISCUSSION OF RESULTS:

Three phases characterize the respirometer oxygen uptake curves. The first phase is an initial period in which little or no oxygen uptake occurs. The second phase is one of increasing rate of oxygen uptake, and the third a period of decreasing uptake. The first phase decreases in length as the initial BOD of the test sample increases. With BODs of 20 to 50 Mg/L the first phase is approximately one hour in length. When the BOD exceeds 100 Mg/L, the first phase is at most five minutes in duration or is not present at all. The second phase of increasing uptake varies from one to three hours but does not appear to be related to the value of the initial BOD. During the third phase the magnitude of the rate of decrease is dependent on the value of the initial BOD. The rate decreases more rapidly for higher values of BOD.

A total of forty-eight respirometer curves were analyzed. It was found that all forty-eight were best fitted by a quadratic equation of the form

\[ y = A(1) + A(2)t + A(3)t^2 \]  

(14)

where \( y \) is the oxygen uptake at any time \( t \) and \( A(1) \), \( A(2) \), and \( A(3) \) are constants. The standard deviation of the computed curve from the actual uptake curve was determined for each respirometer graph. The average of these forty-eight standard deviations is one milliliter.

(Continued on page 24)
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OXYGEN DEMAND
(Continued from page 22)

One area of interest in determining the equation of the experimental oxygen demand curve was the possibility of finding a parameter which would give a prediction of the 5-day BOD. That a correlation between 5-day BOD and oxygen uptake obtained with the Arthur Respirometer exists has been proven by Arthur et. al. However, it was thought that the equation of the uptake might give a more accurate prediction or shorten the time period needed to make the prediction. In the coefficients of the t and t² components of the quadratic equations were plotted against 5-day BOD. Neither of these two parameters give a better correlation with BOD than the four or seven hour oxygen uptakes as demonstrated by Arthur et. al.

A closer examination of the uptake equation yields some interesting information. Differentiating equation (14) gives
\[
\frac{dy}{dt} = A(2) + A(3)t
\]

This is a rate of oxygen uptake at any time t. Rearranging equation (14) gives
\[
y = A(1) + \frac{A(2) + A(3)t}{t} \quad (16)
\]
and substituting equation (15) into equation (16) gives
\[
y = A(1) + \frac{dy}{dt} \quad (17)
\]

Since A(1) is the oxygen uptake at t=0, theoretically it should also equal zero. Then
\[
y = t \frac{dy}{dt} \quad (18)
\]
or
\[
\frac{dy}{dt} = \frac{1}{t} \quad (19)
\]

This then states that the rate of oxygen uptake is proportional at any instant to amount of unoxidized organic substrate remaining. This is similar to the classical biomolecular interpretation but with an important difference, the constant of proportionality is not time invariant.

Equation (19) indicates that when t is very small, the oxygen uptake is very large. However, this is not the situation. As was said earlier there is lag phase at the beginning of the respirometer curve. This lag phase is thought to result from a low initial bacteria population. Since this would definitely limit the uptake rate, the equation would not be valid. As t becomes very large and y becomes small, the rate of oxygen uptake is slowed considerably. This agrees with the experimental results.

Further work should be done on the why of short term oxygen demand curves. Since it seems reasonable that the size of the bacteria population would affect the BOD rate of a test sample, the second order reaction equation of Revelle et. al. is an attractive area for study.

The first three to four hours of the respirometer curve is the period of the poorest fit to the quadratic equation. Consideration of this period exclusive of later portions of the curve may prove to be worthwhile. It is possible that two equations rather than one are necessary to give a better description of short term oxygen uptake. Furthermore, a better analysis of the early part of the curve may yield a better correlation with BOD.


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Football has very seldom instilled much enthusiasm in the student core at Rose Poly. Those who choose to play the game, can only hope to gain a personal satisfaction because he knows his performance will be noticed only by the small group of avid student supporters and the player's parents. It can be undoubtedly stated that if the academic atmosphere at Rose didn't hinder many of our non-participating athletes as it does, Rose could field a football as well as a basketball, track, and baseball team that could compete on a much higher level of competition than we are able to do now. But this dilemma is a fact of life at Rose, one which new head coach Bob Bergman knew he faced when he accepted the head coaching job last spring.

With the help of his assistant coach Jerry Anderson, Coach Bergman began our pre-season drills the day after Labor Day. Aside from the problems already mentioned, the coaches were training a team that numbered only 40, of which 45% were freshmen and half of the remaining number were sophomores. That left only 11 juniors and seniors. In general, Rose has a young but talented ball club. Our success depends upon how soon the inexperienced players learn to use their talents under game conditions.

Meanwhile, the veterans will be forced to carry the load. Tri-captains tackles Pete Doenges, Jack Mehok and quarterback Charlie Hills will be giving their all and leading the team. Also included are seniors John Jacobi - flankerback and defensive linebacker; Jose' Ibanez - P.A.T., punting and field goal centering specialist; John Leonard - offensive guard and defensive lineman; Gordon Higbee - defensive linebacker and a versatile offensive lineman. The remaining lettermen are: Junior offensive guard and linebacker Clint Cathcart; Sophomores Roger Lacrosse - defensive halfback and quarterback, Roger Ward - halfback, Dan Peelman - linebacker and fullback, Tom Merrill - fullback and linebacker, John Austgen - offensive tackle and linebacker, Denny Smith - offensive and defensive tackle, and Buz Scharringhausen - center and defensive end.

Those hoping to take up the slack are Juniors Dick Shallcross - halfback, Foster McMasters - offensive end and defensive tackle, and Dan Meek - offensive and defensive end; Sophomores Alex Tomanovich - flankerback and defensive safety, Steve Egenolf - offensive guard and defensive end, Greg Dawe - end and defensive halfback, and Bob Penno - end and defensive halfback.

The 18 aspiring frosh on the squad are: quarterback Larry Geir; halfbacks Ed Adams, Clarence Duttlinger, and Dave Wanninger; flankerback Steve Powell and Mark Spouls; fullback Dick Sturniolo; guards Chick Sweeney, Tom Blanford, Randy Shoaf, Dave May and Norm Kline; Center Dan Moss; tackles Bruce Binkley and Lance Kuhnaphel; ends Dennis Sullivan, Dave Burgner, and Mike McShane.
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Lady to police department: "Come quick! I just ran over an engineering student."
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Male voice on the telephone: "Hello, doctor, my wife just dislocated her jaw. If you're out this way in the next few weeks, would you mind dropping in?"

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"Very interesting," he returned, "Have you tried Clorets?"

"Hell," said Satan, as he answered the phone.

Professor (pointing to a cigarette on the floor): "Jones, is that yours?" Jones (pleasantly): "No, sir. You saw it first."

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Patient: "Well—yes and no."

Doctor: "How's the engineering patient this morning?"
Nurse: "I think that he's back to normal. He tried to blow the foam off his medicine."

Grandmother was walking down the street wheeling a baby carriage. "Go to sleep, Diploma," cooed Grandma to the little tot in the carriage. A neighbor friend who was passing by asked, "That's a peculiar name. Why do you call the child Diploma?"
"Well," said the grandmother, "I sent my daughter to college, and this is what she brought back."

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Dear Mary,
I just read in the paper that students who don't smoke make much higher grades than those who do. This is something for you to think about.

Love, Dad

Dear Mary,
I have thought about it, but truthfully I would rather make a B and have the enjoyment of smoking; furthermore, I would rather smoke and drink and have a C. In fact, I would rather smoke, drink, and neck and make a D.

Love, Mary

Dear Mary,
I'll break your neck if you flunk anything!

Mrs. Jones was sitting in the breakfast nook shelling peas when she heard a knock at the door. Thinking it was her son, she called, "Here I am darling." Silence . . . Then a deep voice answered, "This is not the regular milkman, ma'am."

Cannibal: "We've just captured a college professor."
Chief: "Good, I was hoping for a bologna sandwich."

Rumor has it that Professor Coddington of the M.E. Dept. was trying to tell a joke to his Statistics class. He allegedly asked, "What do you get if you cross an elephant with a grape?" Before he could give the answer, however, a bright student who had been studying vectors the night before answered, "(grape) (elephant) sin o."
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Want to be a college president? For further information read John Fish's article on page 8.

Courtesy of John Grauel, the Technic presents a look at the ROTC department on page 10.

What is “CIDES”? See page 12 and find out.

On page 16 Jim Stewart’s winning Tau Beta Pi essay on the Negro student’s search for identity is presented for our readers’ edification.
An Internship at Rose .................................................. John Fish

ROTC at Rose Today ................................................. John Grauel

CIDES Program

A Search for Identity ................................................ James Stewart

Homecoming 1968

Editorial

Guest Editorial

Miss Technic

Sly Droolings

* * * * *
Real life situations usually teach us that in group endeavors of various sorts, where that group has either implicitly or expressly agreed to operate by a certain set of rules, individuals at least occasionally grow lax in observing such rules, which ironically are essential to the existence and progress of the group endeavor. Reasons behind this forsaking of the responsibility of honoring a given working code which sustains the group endeavor are numerous and might include: pressures from outside the framework of the given endeavor, breeches in personal integrity, apathy or loss of contact with the necessity and urgency of respecting the parts and whole of the group agreement, outright laziness, the unconscious allowance of inconsistencies in the individual's code of conduct, etc., all these aside from real dissatisfaction with the contents of the group agreement or with the manner in which the goals of the group are being achieved. Hence it is often the practice of the group not only to establish rules of conduct and to settle upon an agreement benefiting those concerned, but also to institute formally or informally some means for policing the group itself, in order to protect the interests of individuals and to insure the sustenance, growth, and general success of the group's efforts. Perhaps the individuals of the group would ideally just as well not bother to establish a mechanism of self-protection, which implicitly considers the possibility that individuals may fail to maintain a minimum standard of conduct or achievement, but the necessity of such continues to arise as the only workable insurance policy that the group can take out on itself.

Science and engineering are areas which qualify immediately as tremendous group endeavors, in which strict adherence to the principles of a system of reason and of dedicated, clear-minded searching is essential on all levels—from the actual performance of work related to these areas, to personal conduct which in any way affects the outcome of endeavors in these areas or the personal welfare of individuals enjoined in those endeavors.

In science and engineering, nothing can be achieved where personal integrity fails. In order that such failures, assuming their occurrence is possible, will not seriously endanger or frustrate the general functioning and success of the group, it is not uncommon that the scientist or engineer organizes into societies or professional groups. The main purposes of such groups are to recognize outstanding efforts in various fields, and to serve as guardians for the interests of the profession by bringing to the attention of the erring individual his inconsistencies or his disregard for the responsibilities he must assume and offering that individual the choice between his making an honest effort to redeem himself and take a responsible place in that profession, and simply getting out.

This uncompromising, realistic approach to maintaining some minimum standard in the profession is most often assumed by the man actively engaged in that profession. Yet strangely it is often the case with the modern student of science and engineering, regardless of moral or ethical conviction, to be rather reluctant to exercise the same amount of discipline on his own level among fellow students.

This manner of avoiding the issues may stem from the possibility that he identifies with and senses strongly the pressures, academic and otherwise, which may drive a fellow student to hedge on his responsibilities to himself and his school or to behave in a manner detrimental to the interest of science and engineering. Regardless, the student must be brought to recognize the problems he will face in professional life after graduation, and to begin upon a program, as early as possible in his own life, which can serve to encourage professionalism, integrity, originality, and pride in himself and his fellows and to protect the interest of all concerned.

In light of the above discussion and of the fact that modern students have one way or another maneuvered themselves into a potentially prominent position with regard to university policy-making, an excellent place for the student of science or engineering to start asserting himself would be in the area of rendering his own and his fellow's general character unquestionable by exercising with the cooperation of his peers an honor code, an active honor system or other similar forms of program for policing his own ranks.

Such would be especially effective if instituted as a student-run project rather than as a long-standing tradition established before the students' time, as is often the case in many modern colleges and universities. Rose is primed for such an attempt and it is my hope that the Rose man will begin to consider seriously possible moves in this direction. I can think of no better way for him to prepare for life after graduation and to provide a framework for encouraging school spirit and pride, as well as professional integrity.

The modern student has taken to a great deal of clamoring about his own supposed repression and subjection to injustice, yet more than not his offerings consist of snide, contemptuous criticism with belligerent overtones rather than of realistic alternatives or constructive comment. I would venture that, especially at an institution of the nature of Rose Poly, faculty and administration alike are waiting in the wings for signs from any group, that students are willing to take the responsibility of considering and acting on relevant and inevitably difficult issues—to attempt to place themselves, even within the sheltered framework of American higher education, in real life situations and to deal with and among themselves as though their lives depended on it, for tomorrow their lives and futures will!
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Without these qualities, metal lies hidden, useless. And can never reach the potential necessary if we are to answer these problems at all. That is why Anaconda has a commitment. To back the creative energies of our human resources with our faith in the future, and our money, to meet the growing needs for metals.

In the last 10 years we invested $750,000,000 for new plants and equipment. There will be another $650,000,000 in 1968-1972. Plus, we have research on a global scale. A whole new western exploration headquarters in Salt Lake City, and an extractive metallurgical research laboratory in Tucson. Staffed with specialized scientists, geophysicists, metallurgists, mining engineers and other highly trained individuals. This is the kind of backing we give to our people.

And the people we need are numerous. Teams of earth scientists, metallurgists, mining engineers. Fabricating, marketing and financial specialists. All the sort of dedicated people that know their work is vital and important. Anaconda. Come make a future with us.

"'When you get to 125th Street look out the window—and give a damn.'" So said Mr. William H. Wisely, Executive Secretary of the American Society of Civil Engineers, in an address, recently, to a group gathered at the University of Illinois for the purpose of reviewing recent developments in Civil Engineering Planning Technology. He was quoting a sign which hangs in the commuter train he daily rides to work in New York City, along the route of which 125th street lies in the heart of Harlem. In the same address he mentioned a recent report on water supply for New York City in which it was mentioned that a third water tunnel is essential if that city is to be able to attract more industry and more people. In a third reference, Mr. Wisely quoted Dr. Merrill Eisenbud, the Commissioner of Environmental Protection in New York City as delineating "... all of the city's problems of physical environment with great clarity, telling how they could not be solved because of lack of money, space, public support and a host of other reasons."

Of course, what Mr. Wisely is pointing out in these examples is the clear lack of foresight which has been, and still is being, used by the creators of our cities. He chose New York City only as a "glaring" example of the situation that exists throughout America today. Our urban centers have evolved through a continuous and haphazard process of stop-gap measures and make-do procedures which have been essentially devoid of thoughtful and logical considerations of future consequences. Sound planning has been notably absent.

We in the Civil Engineering Department at Rose agree with Mr. Wisely in believing that the responsibility for the solutions to these problems certainly lies, at least in part, with the civil engineering profession. Because of this belief we have recently begun to reshape our thinking with regard to what an undergraduate education in civil engineering should properly be.

Consistent with the general philosophy of Rose Polytechnic Institute, that of "the pursuit of excellence in engineering and science education", the particular ideals of our Civil Engineering Department today are based on the following three tenets:

1. A civil engineer, first of all, serves mankind on a broad scale.
2. The domain of civil engineering practice consists of all space which man will choose to inhabit.
3. A civil engineer must be capable of bringing to bear all the forces of modern technology necessary to shape man's environment, through research, through design and analysis, and through skillful and artful evaluation, development and realization of environmental control projects.

It is our opinion that a civil engineering graduate, going forth into tomorrow's society, will have had an optimum preparation for his future encounters, not solely through the conventional curricular approach which stresses components oriented courses in structures, hydraulics, sanitary engineering, etc., but through a systems oriented curriculum geared to train him in the ways and means of planning man's future environment.

It is our hope that the final products of our efforts here will be groups of citizens who are: technologically competent, though humble; creatively inspired, though practical; and stimulated with a deep concern for humanity, though realistic. To put it another way, we hope the C. E. graduate will care when he passes 125th street, or any other street for that matter, and, based on that concern, be able to design technologically and creatively plausible plans for the betterment of man's environment.
"IBM is so involved in the electronics field, I'd always assumed they weren't particularly interested in M.E.'s," says Andy Simon.

Andy got his M.E. degree in 1967. He's now a packaging engineer in memory development at IBM.

Andy found out why IBM needs good mechanical engineers when he went to his campus interview. As electronic packaging gets smaller and packaging density increases, a lot of new problems arise. And the M.E. has to solve them.

As Andy says, "When I design the hardware package for a micro-electronic memory unit, I deal with heat transfer and other thermal problems, vibration and shock analysis, and electromagnetic compatibility. The associated connector design work gets me into stress and creep analysis and Hertz contact stress and evaluation."

Then comes production
That's only part of Andy's job. After his team designs, develops, and produces a prototype memory unit, he has to work closely with manufacturing engineers, advising them on machines and processes to mass-produce the unit.

"It's tough but rewarding work," says Andy, "because the problems change with each new assignment. So an M.E. gains a lot of experience fast.

The kind of experience that helps him move ahead fast."

Check with your placement office
If you're interested in the opportunities for mechanical engineers at IBM, ask your placement office for more information.

Or send a letter or resume to Irv Pfeiffer, IBM Corp., Dept. BM2010, 100 South Wacker Drive, Chicago, Ill. 60606. We'd like to hear from you even if you're headed for graduate school or military service.

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Rose Polytechnic Institute is one of thirty colleges and universities throughout the nation which are participating in the recently established Academic Administration Internship Program operated by the American Council on Education. After two days of extensive interviews in Chicago about a year ago, Dr. Ralph A. Llewellyn, Professor of Physics and Director of Research at Rose, was chosen as an intern to observe and study the administrative tasks at Rose as they are performed by President John A. Logan.

The purpose of the program, which is sponsored by grants from the Ford Foundation, is "to strengthen leadership in American higher education by enlarging the number and improving the quality of persons available for key positions in academic administration. Its objectives are to help institutions identify younger faculty and staff who have shown some promise for academic administration; to encourage these persons to make academic administration their professional career, and to prepare for it; to provide them opportunities for planned observation and experience in decision-making; and to learn more for higher education about identifying potential administrative talent and developing it."

During a recent interview, Dr. Llewellyn noted certain observations which he has made during the first few months of his internship to President Logan and elaborated on those problems which face not only the Rose administrators but university directors throughout the country. One such example was that of nationwide student unrest which seems to plague the United States. One of Dr. Llewellyn’s fellow interns and friends at the University of Illinois was well aware of the possibilities of such unrest on his campus at the beginning of this school year. Soon thereafter his predictions materialized when a certain group of Illinois students demonstrated their disapproval of campus housing provided them by seizing control of the Illini Union. The relevant point of such an occurrence is not so much that the students were unhappy, but instead the fact that the Internship Program offers the unique opportunity for prospective leaders to become adept in spotting such trouble areas and to gain experience in coping with such problems before they actually assume a university presidency.

Dr. Llewellyn also expounded his views on what he considers to be a popular misconception concerning the power and sovereignty of the university president. He listed at least six sources of constraint which restrict the actual decisions of any president. Namely, (1) the student body, (2) the faculty, (3) the board of managers (4) the second-level administrators such as the dean of faculty, registrar, etc., (5) the public outside of the academic sphere, and (6) the prospective student body of an institution. Each of these has a definite influence of varying degree upon any decision a university president makes. Although these restraints are prevalent at any institution, Dr. Llewellyn believes that at a small school such as Rose they are even more pronounced. It only seems reasonable that when the faculty, student body, and president are more closely associated a wrong decision by any one segment receives stronger criticism than it would if their association were more remote. An example cited by Dr. Llewellyn was the opposition offered by some faculty disciplines and second-level administrators to the establishment of the interdisciplinary approach to engineering at Rose. Such programs are already in existence at Case Western Reserve and Harvey Mudd, and offer a unique method for training men for service in the field of engineering sciences. Under the interdisciplinary approach undergraduate students do not specialize in any single engineering discipline but in-

(Continued on page 15)
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AN EQUAL OPPORTUNITY EMPLOYER
The ROTC curriculum at Rose has undergone substantial changes in the past three years. New leadership has brought vast changes in both the old “drill” periods and the class work. Leadership laboratory is now oriented toward leadership. Freshman and sophomore class work has turned toward the history and science of the military. To institute these new programs it has been necessary to nearly double the staff of the Military Science Department.

From Drill to Leadership Lab

The size of the Rose Corps of cadets has increased as the size of the Rose enrollment has increased. In 1965 slightly over 400 took part in the program, whereas over 600 now constitute the corps. This increase in size has necessitated a growth from a battalion to a brigade organization. In addition, a complete color guard has been added to the brigade.

In the fall of 1965, all drill work was planned and directed by the Military Science Officers and staff. This work consisted of marching, manual of arms, and ceremonies. When the idea of a laboratory (versus a drill) was proposed, it became necessary to analyze the program, and many changes became apparent if the program was to become a meaningful and educational process.

In keeping with recent opinions concerning student participation in their own education, students were given responsibility for the conduct of the laboratory periods. Over the three years this concept has evolved to the point that the brigade and battalion leaders are totally responsible for the planning, directing, and execution of the leadership labs. This provides invaluable experience for the seniors involved in the planning and provides a more meaningful experience to all cadets.

The Brigade Commander is now charged with the planning and direction of the laboratory. Through the cadet chain of command and staff, he prepares the orders, directs the instruction, issues supplies, and accounts for personnel. One of the responsibilities of this command is the qualitative ratings of all personnel for Military Science grades. A system of efficiency reports has been instituted which replaced the less desirable system of merits and demerits. Cadets are rated by other cadets through the chain of command, and these ratings are then incorporated into the Military Science grades.

The new instruction is programmed for a four quarter progressive development which allows a varied schedule with a minimum of repetition. The general program of instruction is as follows:

1. During the fall quarter of the freshman year the cadet learns the customs and courtesies of the Army, wearing of the uniform, and the general concept of training. He learns how to march, and how to handle a rifle. He receives individual instruction in the disassembly, cleaning, and assembly of the

(Continued on page 18)
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EDITORS NOTE: This article is an excerpt from the College Science Improvement Program. Under the direction of President Logan, a group of prominent faculty members have submitted a proposal to the National Science Foundation to obtain funds to establish the Center for Institutional Development in Engineering and Science. The objectives of this project are outlined in the following statement.

The changes made during the past five-year period in the educational program and plant have confirmed the urgent need to establish a Center of Instructional Development in Engineering and Science in order to take advantage of recent developments in education and to improve the overall caliber of teaching in the college.

Rose is particularly aware of the danger of adopting new programs in a piecemeal fashion. There is the ever-present problem of maintaining control of the curricula and in developing physical facilities which would meet the tests of the future.

An important consideration has been the increasing number of young faculty members who, while they have doctorates in science or engineering, have somewhat limited backgrounds in teaching and who need to be provided with opportunities to increase their teaching effectiveness.

Rose Polytechnic Institute has a further need to establish a program such as CIDES for the following reasons:

1. The administration and faculty have clearly stated that the school should direct its principal effort toward developing and maintaining quality undergraduate education in science and engineering.

2. The Institute has advanced in its planning and studies to a stage where it can take advantage of major innovations and development of techniques and aids needed for good teaching.

THE CIDES PROGRAM

First Objective

With a view to immediate results in the improvement of undergraduate instruction in engineering and science, and as input to the final design of our Systems Information and Design Facility, the National Science Foundation proposal has as its first objective the improvement of teaching effectiveness and efficiency by means of improved methodology.

The Institute has an excellent faculty dedicated to teaching as a career. A large percentage of the faculty are young men who would benefit by being able to experiment in teaching methods; there is also a sincere desire on the part of the more senior members of the faculty to review their teaching methods and become acquainted with the opportunities presented by the use of new approaches to teaching.

The plan of presenting the training in methodology is through seminars organized and directed by senior faculty members who have the demonstrated interest and background necessary to carry on this work; they would be provided with the necessary time to make detailed preparation. It is further planned that qualified consultants would aid the faculty members chosen to prepare the seminars.

The training in methodology has several aspects. The first is to provide teachers with background materials in teaching methods relevant to their area of teaching. A second aspect develops from the recognition that each teacher is an individual with individual needs and capabilities for whom there will be some best teaching method. Opportunities and facilities would be provided for the teacher alone or in groups to study himself in relation to his abilities to project ideas and information to others. The success of each teacher is highly dependent on the success of his methods; it has become increasingly apparent that it is unfair to expect a teacher to be both excellent in his field and excellent as a teacher without support in this latter area of responsibility. Determined efforts have been made to provide him with good equipment and facilities; an equally determined effort is needed to make it possible for him to develop his teaching capabilities. A third aspect is that of providing the teacher with the means of evaluating himself. Critiques and evaluations would be available to individual faculty members; programs would be planned to use systems that give the teacher as much freedom as possible to experiment without undue publicity.

While the work in methodology is primarily aimed at improving teaching methods for the benefit of the student, there is another important consideration as far as the Institute is concerned. Good teachers and (Continued on page 22)
We developed TV transmission. But a lot of engineers still don't get the picture.

Like, we’ll ask a graduating engineer: “What opportunities do you think an engineer has if he works for the telephone company?”

And, zap—we get a blackout!

Well, we think the company responsible for engineering innovations such as the transistor, radio astronomy, high fidelity and stereo recording, magnetic tape, synthetic crystals, negative feedback, sound motion pictures, microwave relay, electronic switching, the solar battery and telstar deserves a consideration that’s strong and clear.

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W. W. HOLMES
N. STEIN
O. O. JUVELAND
February 5, 1969

INTERNSHIP
(Continued from page 8)

stead are given a strong background in all types of engineering with special emphasis placed upon the development of a systematic method for tackling any type of problem. Dr. Llewellyn feels that President Logan might favor such a program for Rose Poly but at present is deterred from such action by those ever-present constraints which face all college presidents.

Thus there is a great deal to be said about the hardships any university president must endure. During recent disorders on campuses throughout the nation it has become the trend to place more criticism upon the president of a college than that which is leveled against the dissident students themselves. With such a state of affairs it is not surprising that Dr. Llewellyn is still uncertain what degree of administrative work he desires. He realizes that to become a successful president entails virtual neglect of his chosen field of physics, yet he seemed intrigued with the challenge that university directors face. At any rate the Academic Administration Internship Program has and will continue to provide rare opportunities for insight into the workings of the Rose administrative machinery for both its intern and student body.
SEARCH FOR IDENTITY

By JIM STEWART

With the graduation of John Russwurm from Bowdoin College in 1826 the higher education of the black man in America began. The transformation of the black college student in the 1960's is potentially the most significant development in American society in recent years. This essay is an attempt to examine this transformation.

Traditionally higher education for the black man has been limited to the black bourgeoisie. Even the black colleges of the South have and are still to some extent regarded as middle class institutions. Along with the continuing discrimination against black students at the predominantly white university is discrimination against black students at black universities on the basis of shade-of-skin and parental occupation. Higher education of the black man in America has in the past been geared toward assimilation into white society. Through the areas of education, medicine, and law the black college student has striven for the elusive American dream black students at the predominantly black community colleges and junior colleges in the large urban areas of America. This development has aided the working class black student in making the transition from the semi-academic atmosphere prevalent in the predominantly black high school to the more academically oriented university atmosphere. Another phenomenon aiding in the transformation of the black student is the movement by institutions of higher learning across the nation to attract qualified black students from the working class as well as the middle class through offers of substantial financial assistance. This movement is leading to keen competition among educational institutions for highly qualified black students. Private organizations and scholarship funds for black students are encouraging black students to attend those educational institutions which might be considered to be the vanguard of higher education in America, especially in the East. NSSFNS, the National Scholarship and Service Fund for Negro Students is one such organization. Some of these qualified students are being enticed into the fields of engineering, science, and business administration, areas which have been long taboo to black students. One of the major reasons for the lack of interest on the part of the black student in these areas is the past record of discrimination in these fields. Related to these phenomena is the search for highly trained black college graduates by prospective employers. In the past recruitment of black college graduates by industry was limited to the white university with an insignificant black enrollment. Presently industry, especially the larger firms, are altering their recruitment policies to include black colleges and universities. Competition for qualified black college graduates among industrial concerns is as intense as similar competition for qualified black students by educational institutions.

In both the large university and the smaller educational institutions the increasing black enrollment has enabled the black students to retain their black identity and resist assimilation into white society, which has been a major pressure on the black student in the past forestalled only by the black fraternities and sororities. Linked with the increasing black enrollment is the new awareness of race and race pride engendered by the Black Revolution. On the university campus these two factors have been manifested in black student organizations where black student enrollment is sufficient to support such an organization. These organizations seek, among other things, improvement of the position of the black students on the respective campuses, the inclu- 

(Continued on page 30)
Can there be this kind of excitement in engineering?

A long beautiful drive... just the hint of a slice... and almost on the green. Now, address the ball... concentrate—and, wham! to a lie four feet from the cup.

That's the excitement of the game that gets a golfer up at dawn on Saturdays. We think it's analogous to the excitement that keeps some of our technical people on the job after hours: the pleasure of personal achievement in solving problems for which there are no book solutions.

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rifle, and he takes part in parades and ceremonies.

2. During the spring quarter of the freshman year instruction is presented in bayonet drill, land navigation, hand grenade drill, physical training, and ceremonies.

3. The fall quarter of the sophomore year is devoted to a study of the basic fundamentals of tactics to include squad control, movement, offense and defense, and parades and ceremonies.

4. During the spring quarter, the sophomore learns the skills of rifle marksmanship, and his knowledge of basic tactics is tested through a Leadership Reaction Course. Training in this quarter also includes an introduction to First Aid practices and participation in parades and ceremonies.

World Military History

In the fall of 1968, a new and different course of instruction was presented to the Rose corps. This program consisted of a full year of instruction in World Military History. The course replaced a series of "sub-courses" that were concerned only with pure military subject matter.

The World Military History course begins with ancient warriors and ends with the World War II soldier. It is concerned with the nations and societies that gave rise to armed conflict and the effect of that conflict on the evolution of man. The course develops the principles of war, and explores the art of warfare. The forces that have historically produced armed conflict are analyzed and the results of conflicts are studied. A chronological study of the development of the concepts of war is made, as well as a study of their application to national defense problems and policies of today.

In addition, the principles of war are studied, and an analysis of their application to various situations is made. The evolution of the professional soldier is traced. He is placed in perspective with contemporary society, and his value of society is explored. This study is designed especially to provide a foundation and background on which to base a study of the concept of power in the sophomore year.

The Concept of Power

In the past two school years, a course known as "The American Military System" has been offered to sophomores in place of the old Basic Military Science courses. A new course began with the 1968-69 school year called "The Concept of Power." This course actually evolved from the previous course but showed definite changes as a part of the developmental program designed to improve the academic quality of Military Science instruction.

In "The Concept of Power," analysis is made of a nation's capability to produce and use the elements of power in the international political arena. The problems of national sovereignty and national interests relating to international systems are studied. The evolution of the foreign policy of the United States is developed, and the application of the concept of power in today's world situation is examined. Other general topics of the course include, elements of national power, diplomacy and foreign policy, international law, international economics, international organizations, balance of power, collective security, and disarmament.

Advanced Military Science

Admission to the Advanced Military Science courses is voluntary and selective. Advanced Military Sciences leads to a commission as an officer in the Army on graduation and provides the Advanced Military student with an allowance of $50.00 per month. In the last three years about one in four Rose students have applied for the Advanced Course, and about one in five have been accepted. Evaluation for acceptance is based on leadership, academics, and physical fitness.

The junior course has been de- (Continued on page 36)
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Consult your college placement officer—or write Mr. William L. Stoner, Engineering Department, Pratt & Whitney Aircraft, East Hartford, Connecticut 06108.
good teaching are scarce commodities and the success of the Institute is highly dependent on these factors. Studies of teaching effectiveness have assumed various forms over the years and have been sufficiently meritorious to justify serious consideration. One of the best guides that Rose has had, and one which has been carried on for the past fifteen years, has been the annual survey made by the honorary engineering society Tau Beta Pi. Although the form of this study has varied, its success points up the value of critiques, particularly when made in such a way as to avoid embarrassment to the teacher.

Second Objective

The second objective of the CIDES proposal is the improvement of the techniques of instruction through the use of teaching aids and experimental classrooms.

While methodology is, obviously, one of the most powerful factors in presenting educational material, it can be greatly augmented through the use of teaching aids. For the teacher to acquire an understanding of what can be done through the use of teaching aids, there needs to be provided not only the aids, but the environment in which these aids can be usefully and best employed. Some of the aids and facilities that are planned for study and use are the following:

1. Video taped recordings of laboratory and classroom presentations.
2. Audio taped discussions for students in self-study situations.
3. Slides and transparencies for instructional purposes.
4. Samples of teaching machines, both multiple choice and constructed-response type.
5. Film production and projection equipment, 8 and 16 millimeter, ranging from large class viewing to individual-use types.
7. The use of the Indiana Educational telecommunication system.
8. Experimental classrooms designed to improve instruction in different fields.
9. Supplies for constructing one-of-a-kind demonstrations or teaching aids.

The ready access to these instructional devices will provide the faculty with an opportunity for experimentation. Technician aid will be provided to relieve teachers of the necessity of learning techniques of manipulation and will leave them in a freer position to work with ideas. Most of the faculty have had experience with one or more of the elements discussed and would therefore constitute a nucleus available for doing some of the training. The Institute would, however, need to supplement this assistance with help from consultants.

There has been a special interest at Rose in the use of film and film loops for instructional purposes. The Institute has, for example, the complete National Committee for Fluid Mechanics Films set of films and film loops and has added other sets from a variety of sources. The Physics Department has an NSF grant for the production of instructional films and these have been used to supplement those commercially available.

There is further value to the Institute in carrying out a program of experimentation with teaching aids in that, not only will it improve instruction but the varieties of experience to the students should be a stimulus to self-help and provide an understanding of the methods available for maintaining technical competence after graduation. As practically all Rose graduates work in the fields of science or engineering, they will in turn be concerned with the teaching of others; the experience acquired at Rose will be of assistance to them in disseminating their ideas in their future work.

Third Objective

The third element in this proposal is the development of a self-study laboratory in Mechanical Engineering. This laboratory will serve as a model for more effective instruction in other laboratories of the Institute. It is planned to include an initial set of experiments completely programmed for student use on an "open shop" basis; additional experiments will be added as experience is gained. The following are proposed for initial trial:

1. Experimental stress analysis.

The use of strain gauges and a polariscope in determining stresses will be the fundamental basis of the experiment. By using instructional guides, film loops or video tape, the student will receive instruction in the basic theory of strain gauges and photoelastic techniques. Using prepared specimens he will be guided through some simple procedures that will require him to use strain gauges, a polariscope and the necessary associated instrumentation.

2. Electronic simulation

The student will receive basic instruction in the use and application of a differential analyzer and associated read-out devices. Instructional guides, slides, film loops and/or video tape will be used to lead the student through the various steps. The student will learn the various mathematical operations that can be performed using the proper combinations of resistors, capacitors and amplifiers. Selected differential equations will be solved on the analog computer. Physical models of the system will be available to relate to them mathematical models used in the solution. The student will also be guided to the mathematical solution for comparison with the analog computer solution. An oscilloscope and an XY Plotter will be used to display the output from the computer.

3. Heat conduction

In this experiment the student will measure the heat transfer (Continued on page 24)
Find out how good an engineer you can really be.

We find out in a hurry who has it. And who doesn't.
Because every engineer who comes to work for us is going to have to come up with answers to some of the toughest problems in engineering, chemistry and physics.
And you know what? Without this ability, many of our new ideas would never have emerged. Like our pioneering achievements in computer memory technology. In PCMI, microform systems, and encapsulation. The kind of exciting discoveries any engineer dreams of making.

What can this mean for you?
If you think you're a good engineer, we'll point you in the right direction. And don't worry, you'll go places.
Write William G. Benner, Coordinator, College Relations, Executive and Professional Placement, NCR, Dayton, Ohio, 45409. Or see our campus recruiter.

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by conduction along a thin cylinder or rod. Thermocouples will be used to indicate the temperature distribution along the insulated rod when one end of the rod is subjected to heating or cooling. Both transient and steady-state response will be considered. The necessary review of heat transfer theory and steps to follow in the experiment will be included in the instructional guide.

4. Unbalanced rotating mass
In this experiment the student will investigate the vibrations caused by a rotating unbalanced mass. The equipment for this experiment was designed by Professor J. E. Shipley of the University of Michigan under NSF Grant G-22957. The equipment consists of a cylindrical rotor supported at each end by cantilevers. The ends of the cylinder contain several tapped holes in which small weights can be added to vary the degree and location of the unbalanced mass. Strain gauges on the cantilevers are used to indicate the deflection of the rotor. The rotor is driven by a variable speed motor. Through the instructional guide the student will be required to write the governing equations of motion for the system and to investigate the effect of the balancing weights.

5. Cam dynamics
In this experiment the student will investigate the dynamics of a cam and follower and the phenomenon of separation of cam and follower at high speeds. The equipment for this experiment was designed by Professor J. E. Shigley of the University of Michigan under NSF Grant G-22957. A variable speed motor drives a cam which actuates a pivoted follower. Rotary and linear motion potentiometers are used with an oscilloscope to display the displacements.

6. Fluid mechanics
The student will conduct the experiment by observation of 16 millimeter movies and 8 millimeter film loops. Many different phenomena and principles of fluid mechanics will be demonstrated. For example, a student will be guided through a lesson choked flow, blocked flow, swallowed flow, etc. in a double-throat wind tunnel. Instead of actually running a wind flow tunnel, he will observe what happens on film. Data, such as pressure vs. position, will be given and he will be required to interpret the data and make any required calculations.

7. Strength of materials
In the experiment a multipurpose loading device is used to illustrate principles of strength of materials, structural analysis and stress analysis. The loading device was developed by A. J. Durelli, V. J. Parks, and M. DeMarco of the Catholic University of America under the NSF Grant G-22968. The device enables the student to determine stress and strain distributions in beams through measurements with dial gauges, electrical strain gauges, mechanical strain gauges, and photoelasticity. Applications of the device to the solutions of problems of cantilever beams, simply supported beams, continuous beams, beams subjected to torsion, and dynamically loaded beams are included in this experiment.

8. Automatic controls
In this experiment the student is exposed to various types of control systems using a pneumatic system-control servo mechanism. Equipment for this experiment is self contained and it permits the introduction of the usual variables found in open- and closed-loop control systems. The characteristics of first- through fourth-order systems will be investigated using step, ramp and sinusoidal inputs.

9. Nucleation and crystal growth
The student will receive basic instruction on the development of crystals in order to interpret their contributions towards material behavior and material characteristics. The student will be guided through a study of the rate mechanisms and the accepted equations used in predicting growth rates. One or more crystal structures will be examined for their physical characteristics. Experimental crystal growing will be done only in low or room temperature environments.

The development of the self-study laboratory will be carried out by faculty members provided released time to set up the nine experimental procedures and prepare the programmed instructional materials.

The value of a do-it-yourself type laboratory has been demonstrated on other campuses with some of the better known work being done by Dr. Postelwaite in a botany laboratory at Purdue University. An important advantage to such a method of instruction is that every student is required to do the experiment himself rather than depending on a stronger lab partner.

An important consideration in the operation and development of this laboratory is its increased usage. If successful, the experimental laboratory would be used as a model for other laboratories to follow. The laboratory would be open up to twelve hours per day; students could come and go when convenient for them and take as little or as long as necessary to complete the assigned tasks.

Fourth Objective
The fourth item proposed as part of the COSIP Proposal is a study of the establishment of a link with the Indiana State Universities TV network to permit Rose to receive or exchange programs with Purdue, Indiana, Indiana State and Ball State.

(Continued on page 29)
Meet the 1968 Loop Class

This “class photograph” was taken when Bethlehem Steel’s 1968 Loop Course convened in July.

We’re proud of them, 180 fine young men and women, representing 88 colleges and universities. And now they’re on their way toward important management responsibilities in this dynamic corporation.

How about you—are you interested in a career with horizons unlimited?

We need virtually all types of engineers and other technical graduates. The assignments we offer were never more interesting; your opportunities for progress were never better.

First step: pick up a copy of our booklet, “Careers with Bethlehem Steel and the Loop Course,” at your placement office, or write to our Manager of Personnel.

Maybe next year you’ll be in the picture!

Bethlehem Steel Corporation, Bethlehem, Pa. 18016

BETHLEHEM STEEL
An Equal Opportunity Employer in the Plans for Progress Program
This month's beauty is Miss Cathy McHugh, a blond, brown-eyed drama major from St. Mary-of-the-Woods College. A 5' 3" tall, Southern Belle from Corpus Christi, Texas, Cathy has been very active in her college career. Some of her achievements include her membership in Kappa Alpha Theta sorority, Rose Homecoming Queen, and Sigma Nu Sweetheart.
"I never feel like a rookie"

"Sure it's my first year with B&W, but I've been too busy to think about that. I've been working in my field all along, and the training sort of blends right in."

If Randy Trost sounds like a B&W booster, you should hear what his supervisor says about him.

We're looking for aggressive, talented young engineers like Randy. We want you if you want significant responsibility from the start. In fact, we need more engineers than ever before. That's because we're growing faster. Sales were $560 million last year. Up 17 per cent.

That's how it's been from the beginning. We started out making steam generation equipment. That led to atomic power stations, nuclear marine propulsion equipment, refractories, specialty steel, machine tools, computers, and closed-circuit TV. (And we still make the best boiler in America.)

If you'd like to talk with Randy Trost about B&W, call him collect at our facility in Lynchburg, Virginia, AC 703 846-7371.

In the meantime, be on the lookout for the B&W recruiter when he visits your campus.

The Babcock & Wilcox Company, 161 East 42nd Street, New York, New York 10017.

Babcock & Wilcox
Universities. A television communications network connecting these four universities has been established by State authority and has encouraged participation by the private colleges. Rose Polytechnic Institute has been in communication with the State University Telecommunication Coordinating Council and nearby Indiana State University; the Institute has expressed to them its interest in participating in the program.

Sufficient programming has been done on the network to have established its capabilities to the participating institutions. The telecommunications facilities at Indiana State University are well developed and contain major facilities for television work. The facility includes studios, commercial quality recording and transmission equipment with appropriate switching equipment to receive and disseminate programs originating within the entire circuit. They have a well organized administrative and operating staff for these facilities. The availability of such excellent services at this time make it feasible for Rose to undertake studies of the service to measure its capabilities in terms of the college's program and to tie-in with the network on an experimental basis.

In the tentative examinations made to date of the activities available and carried on on the network it has been determined that Rose, in order to benefit by the network, must undertake an extensive study of how best to use the network programs in its own curricula. Problems involved in the use of the network go beyond the matter of curriculum considerations; they include the question of the costs of such participation and the methods whereby these costs can be met within the framework of the Rose budget.

A full appreciation of what can be done with network programs can only be achieved by a detailed study of the numerous interrelationships which exist in their use. These include studies of the effect on the Rose curricula, the effect on the learning process, the reaction of the faculty and quite importantly, the predictions of methods to absorb the costs of participating in the program.

These studies would require faculty released time with the advice of consultants to aid in equipment studies. Some initial experimental work will be done on the campus using closed circuit television employing low cost equipment. The importance of making pilot studies has been emphasized by the magnitude of the cost indicated in quotations for commercial television equipment that would be compatible with our needs if the Institute were to affiliate with the State network.

Fifth Objective

The fifth and last item in this proposal provides for the establishment of communications with college and university centers developing new approaches to teaching.

As indicated earlier in the proposal, much of its background comes from the experience the Institute (Continued on page 30)
has had with faculty visits to other schools to study their operations. These visits have been so useful to the college that continuing consultation and cooperation with other colleges is clearly indicated as being important to Rose's development. Funding for this activity is requested in this proposal and the moneys would be used to make it possible for the Rose faculty to carry on communications with selected schools on a continuing basis and further to bring to this campus representatives of those schools having relevant programs. The visits have stimulated the participating faculty by exciting new ideas and new enthusiasms. The visits planned in this COSIP proposal will provide the stimulus that would help insure the success of the overall proposal.

THE RESULTS
The ultimate results of the CIDES Program would be the achievement of the goals previously described and would welcome a part of the permanent operating program of the Institute. They would provide detailed background for the components and facilities to be placed in the Systems Information and Design Facility.

Concurrently, the Institute would have assurance that it was meeting the problems of developing and maintaining a high level of teaching competence in its program and would further insure the viability of the Institute for the years ahead.

As a privately endowed college it must have support, not only from alumni, but from corporate-giving programs. It is a source of satisfaction that the alumni strongly support the college, particularly in terms of the percentage of alumni making financial contributions. The largest percentage of our alumni are career men in the field of science and engineering, fields which are somewhat limited in their ability to provide incomes which would make it possible to provide substantial individual giving to the college. We are, therefore, dependent also upon corporate giving and the CIDES Program could provide the basis of documentation needed to secure corporate support for Rose's future.

All of the goals and results expected fall within the objectives of the Rose philosophy and are aimed at enhancing the achievement of the philosophy.

SEARCH FOR IDENTITY
(Continued from page 16)

sion of courses in the history of the black man in the university curriculum, and representation in campus affairs.

The black college student of the 1960's is the product of a social revolution that is continuing in America today. The black college student of the 1960's is rejecting pacifism and embracing activism, consequently the black college student of the 1960's is willing to make himself an indispensable ally to the black man in the ghetto in their common fight for their inalienable rights as human beings, in their common battle against the forces of institutionalized racism—a battle which is far from being won and has thus far been an unsuccessful battle in America.
Tomorrow, Paul Barr may even get to his desk

Paul Barr is a hard man to catch. He may be at the bench sweating over a prototype circuit... or have his head under a car lift surveying the built-in problem. He's got lab people hopping and test drivers in and out of spins. A couple of friction experts shake their heads when they see him coming. But wherever development engineering leads on a sophisticated new braking system, Paul Barr's on his way. And no two Mondays ever start alike. The question is... can you say the same? Take a good look at how your career shapes up, compared with Paul's and his colleagues' at Delco. You might even call us collect. Area Code 317/459-2808, Or, write: Mr. C. D. Longshore, Supervisor, Salaried Employment, Dept. 400, Delco Radio Division of General Motors, Kokomo, Indiana.
Slowly she rises . . .

Gone in a moment . . .
Her Majesty, the Queen and Court

Homecoming 1968

The Lewistown Singers

Rosie rides again
GRIDIRON ACTION

FRATERNITY COMPETITION

Triangle

Lambda Chi Alpha
ROTC

(Continued from page 20)

veloped into a full year of study of the philosophy and principles of leadership. The work for the course involves instructional methods, principles of leadership, leadership of small units, and small unit tactics. A strong emphasis is placed on the practical application of the studied principles during the leadership laboratory.

Advanced Course students attend a six week summer camp at Ft. Riley, Kansas between the junior and senior years. The work at Ft. Riley is an extension of the practical and theoretical work at Rose. At Ft. Riley, the cadet holds positions of leadership, takes part in tactical exercises, becomes familiar with and fires many weapons, witnesses demonstrations of the small unit tactics of artillery and armor, and the air support of the infantryman.

During the senior year the student studies the management of the Army for small unit leaders. Training is provided to enable the officer to solve the problems of strength accounting, logistics, intelligence and Army administration, which he will encounter daily in his leadership position.

A course in Military Law is offered in the third quarter of the senior year to acquaint the cadet with regulations and policies which will be involved with active duty control and discipline matters.

The officer goes on active duty sometime during the year following his graduation and commissioning. His first assignment is to the branch officer school of the branch to which he was assigned. At this school, the officer learns the skills and techniques that are particular to his branch. These branch schools have shown promising results for the Rose graduate. For example, for the cadets going on active duty in the past year, 63% were in the top one-third of their officer branch class.

Future success has been attained by many Rose graduates in the Army. Of special note are two general officers presently on active duty who are Rose graduates, Major General Dalrymple, class of '35, and Brigadier General Appel, Class of '41.

Thus, it is seen that recent changes have brought the ROTC program to a more meaningful and educational experience, which trains the student for a challenging tour of duty in the Armed Service. This evolution accounts in part for the increased size of the ROTC program, because the material presented has become interesting as well as necessary, and thereby attracting students to the Advanced Corps. It can certainly be said that the Rose ROTC program has improved by a tremendous percentage over the last three years, presenting not only better representation of Army programs and education, but presenting the Rose student with opportunities never before possible.
These fingers once trembled uncontrollably.

The affliction, Parkinson's disease or "shaking palsy." Its cause, a bit of diseased tissue deep within the brain—making the hands tremble uncontrollably.

For years, doctors tried many ways of destroying the troublesome spot. Today, in carefully selected patients, operations for Parkinson's disease are performed safely and successfully with a new type of surgery based on cryogenics—the science of extreme cold—that was pioneered by Union Carbide.

Working with surgeons at Saint Barnabas Hospital, New York City, Union Carbide designed equipment by which the intense cold of liquid nitrogen, at 320 degrees below zero F., is applied with pinpoint exactness to the diseased tissue. Instantly frozen and destroyed, the uncontrollable trembling ceases.

Medical science is finding more and more uses for intense cold—another example of how Union Carbide takes familiar things and puts them to new and beneficial uses.

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HIGH SCHOOL GRADUATES OF 1968

You are cordially invited to visit Rose Polytechnic Institute where you can earn a degree in:

- BIOENGINEERING
- CHEMICAL ENGINEERING
- CHEMISTRY
- CIVIL ENGINEERING
- ELECTRICAL ENGINEERING
- MATHEMATICS
- MECHANICAL ENGINEERING
- PHYSICS
We're looking for savvy engineers and scientists who have wonderlust. Who want to know and like to dig. Guys with the nerve to get a job done and an idea across. We're looking for men who are willing to explore for new customers and new uses for the world's most modern fuel. Or to explore the feasibility of using nuclear detonation to create underground natural gas storage reservoirs. Or to develop fuel cell systems to convert natural gas to electric energy.

We want men who feel the excitement of the pioneer and who have engineering and scientific know-how that can be molded into sales, thermodynamics, energy conversion, operations, applied research, long distance transmission and distribution . . . almost any area you name.

If you're our explorer, contact our Director of Placement, Columbia Gas System Service Corp., 1600 Dublin Road, Columbus, Ohio. Or write, wire or phone collect to the Director of Placement at one of the Columbia locations listed.
An engineer is said to be a man who knows a great deal about very little and who goes along knowing more and more about less and less until he finally knows practically everything about nothing.

Whereas, a salesman is a man who knows very little about a great deal and keeps knowing less and less about more and more until he knows practically nothing about everything.

A purchasing agent starts out knowing practically everything but ends up knowing nothing about anything due to his association with salesmen and engineers.

"It all comes back to me now," said the skunk after the wind had reversed direction.

A scientist and an engineer were standing in opposite corners of a room. A man with a beautiful blond was in the middle of the room. He told the scientist and engineer that whoever got to her first could have her, but they could only go half the distance at a time. The engineer took off running, but the scientist only stood there and said:

"You stupid engineer! I'm not wasting my time because I know if you go only half way each time, you'll never get there."

The engineer replied, "You're quite right—but I'll get close enough for practical purposes."

A Texan had a small farm with just a few sheep. One day his wife, while dyeing some bedspreads blue, had a little lamb fall into the bucket of dye. A passing motorist saw the lamb with the blue fleece and bought it for $50. So, the Texan figured he had a good thing going and colored some more lambs which brought big profits.

"Pretty soon," he recalled, "I was coloring them pink, blue, yellow, and green; and you know, now I'm the biggest lamb dyer in Texas."

Chem. E.: "Aren't you afraid of the big bad wolf?"
Female: "No, why?"
Chem. E.: "That's funny; the other two pigs were."

A mathematics professor complained to the policeman that a student had almost run him down as he attempted to cross the street.

"Did you get the license number?" the policeman asked.

"Well, not exactly," the professor said. "But I do remember noticing that if it was doubled and then multiplied by itself, the cube root of the product was the original number with the integers reversed."

Censors: People who inhibit the earth.

It has come to our attention that students who apply to attend Rose are now required to take a new entrance exam in addition to the usual admission requirements. In the new exam, applicants are sent to a magic show; and their reactions are carefully noted. If you sit there and take it all in, you pass. However, if you ask questions and try to figure it out, you can still come to Rose but cannot major in either physics or E.E.

A man was stopped by an attractive young woman as he walked down the street. When she realized she did not know him, she said: "Oh, excuse me. I thought you were the father of two of my children!"

He stood there, dumbfounded, as she walked away, never realizing that she was the seventh grade teacher at the neighborhood school.

Pants are made for men and not for women. Women are made for men and not for pants. When a man pants for a woman and a woman pants for a man, they are a pair of pants. Such pants do not always last, and then they are called breeches of promise. This often turns into a suit. When two couples are mixed up in a suit, all panting, it is a suit with two pair of pants.

Postcard to the Weather Bureau:
"Sirs: I thought you would be interested in knowing that I have just shoveled three feet of partly cloudly from my front steps."
you're right. But not home radios for music, news, weather and sports. Collins does...

- Supply communication/navigation equipment for more than 75% of the world's commercial airliners.
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What does this mean to you? It means that college graduates are finding assignments that challenge their ingenuity in activities ranging from microminiaturization to airborne computers.

At each of Collins' four major facilities, opportunities exist in electrical, mechanical, and industrial engineering, and in computer science.

Collins representatives will visit more than 100 campuses this year. Contact your College Placement Bureau for details. Or you may send your resume, in confidence, to Manager of Professional Employment, Collins Radio Company, Dallas, Texas 75207; Cedar Rapids, Iowa 52406; Newport Beach, California 92660; or Toronto, Ontario.
Bob Nerad seeks recognition

But not just for himself.

Bob was Chairman of a special Jaycee project to select the “Outstanding Young Educator” in Schenectady, New York.

He began by rediscovering firsthand some of the vibrant situations that confront young teachers. With that background he was ready to coordinate the nominating and judging.

Planning and coordinating come naturally to Bob. As a Production Control Specialist with General Electric’s Medium AC Motor and Generator Department, he keeps production lines running smoothly. Coordinating machinery, raw materials and labor is crucial to any efficiently run business.

With a mechanical engineering degree from Cornell, in 1962, and an MBA in personnel administration from George Washington, in 1963, Bob sought to plunge directly into meaningful work. He’d had enough theory and simulations to last him for awhile.

At General Electric he found people that agreed with his thinking, and what’s more, GE offered him immediate responsibility via the Manufacturing Management Program.

Like Bob Nerad, you can get a fast start at General Electric, in R&D, design, production or technical marketing. Talk to our man when he visits your campus. Or write for career information to: General Electric Company, Room 801B, 570 Lexington Avenue, New York, N. Y. 10022

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