



College Joins New Work-Study Program

In order to encourage greater college enrollment among deprived groups, City College is participating in a Federally-supported "college work-study program," announced Dr. Buell G. Gallagher, president of City College.

Under a provision of the Economic Opportunity Act, needy City College undergraduate and graduate students will be employed to perform educationally relevant work on part-time assignments on or off campus.

Almost \$48,000 in federal funds has already been allocated to City College for the current semester for student salaries which will range from \$1.25 to \$1.35 per hour. Under the provisions of the grant, federal funds will provide 90 per cent of the cost, while City College will pay 10 per cent.

Dr. Louis Long, chairman of the Department of Student Services at City College and administrator of the program, said the new program "will hopefully enable many academically qualified students, who now are forced to

work full-time, to take advantage of free higher educational opportunity at City College."

Students participating in the work-study program will work as typists, clerical aides, laboratory assistants or library aides in college departments. Those who will work for general public or non-profit private institutions in the neighborhood are expected to serve as assistant group leaders, aides or tutors. Students may work up to fifteen hours a week.

It is expected that many students who work in the program will be returning to familiar surroundings and will be well aware of the problems facing minority groups.

Dr. Long indicated that other

(Continued on Page 3)

Registrar Pleased With Exam System

By EDWARD SMITH

The implementation of a new system of conducting final examinations at City College has met with apparent success, according to Registrar Robert L. Taylor.

The basis for his satisfaction was a 90 per cent reduction in the number of conflicting examination arrangements which must be made at the end of the term, coupled with other attractive features, such as increased study time for the tests with no sacrifice in class time.

The need for a change in procedure has a multiple origin. The old system involved almost two weeks of formalized testing. The college administration found it increasingly difficult to cope with the physical space limitations, congestion, and the shift from a recitation to a testing schedule which a college of our size presents.

Last Spring in a letter to President Gallagher and the Deans of the various schools Mr. Taylor sent his proposals on the subject. These were to form the basis for the new system. A schoolwide committee was appointed by Dr. Gallagher to research the feasibility of these and other suggestions. Gustave Bischof and Demos Eitzer were representatives from the School of Engineering and they carried with them the enthusiastic support of the technical students for support of a study period before the beginning of tests.

The result was the new policy of a week of conducting tests in the class setting when possible and then a week of formalized tests for multiple section courses. Extra time for study was pro-

vided through the release of students from the last week of class where tests were held during the scheduled week.

Reaction among students was generally good, although certain individuals had rather poor test distribution with clusters of examinations in either the formalized or in-class periods. For these individual cases, correction is almost impossible. Later this month there is to be a meeting of Deans in order to reevaluate the procedures and to improve them if possible.

To a conscientious student the most important aspect of college life is how he functions academically. This is a praiseworthy attitude, especially for a student enrolled in a curriculum as difficult as engineering. On the other hand, students who participate only in the academic aspect of school life may someday sadly find themselves lacking the qualities that help make a person socially interesting and emotionally mature.

TECH NEWS is an organization that asks little of its staff members in respect to time. We realize that engineering students find it difficult enough to meet their academic obligations. But if you are an engineering or architecture student with two hours to devote a week, we hope you will seriously consider joining our staff. TECH NEWS offers you the opportunity to broaden your interests, interview engineering faculty members, meet other students, and work for your newspaper. Come see us Thursday, 12-2, in 335 Finley, or leave your name and telephone number in our mailbox in 152 Finley.

Space Jobs In Decline

The backlash of cutbacks in the aircraft and aerospace industry is still being felt on college campuses this year.

The first report of the season, released today, shows that offers by aircraft firms to college seniors are continuing to decline sharply, maintaining a trend noted last year. In the Council's first report of 1962-63, this employer group accounted for 920 offers, 45 per cent of the total. Last year the figure was 724, 36 per cent of the total, and this season it has dropped to 447, or 20 per cent.

The survey, based on data from placement officers at 108 selected colleges and universities from coast to coast, is being conducted for the sixth year by the College Placement Council, national headquarters of the eight regional placement associations of the United States and Canada. The current report covers offers from the beginning of the fall recruiting season to December 15.

While the number of aircraft offers on the bachelor's level continued to drop, the electronics group, which declined sharply in the fall months last year from 177 offers to 79, has climbed back up to 131 this season. Public utilities, after going up dramatically last year, have leveled off in the first period of 1964-65. Also showing an upward trend are the automotive, banking, glass, merchandising, metals, petroleum, and public accounting categories.

The decrease in aircraft activity is especially evident in the case of electrical engineers. The number of offers to these students has dwindled from 777 in the first period two years ago, to 578 last year, to 443 this year — despite the rebound by the electronics industry. Aircraft employers are apparently showing greater interest in aeronautical than in electrical engineers, for 31 per cent of the industry's offers this season have been to aeronautical candidates, compared to only 10 per cent two

(Continued on Page 5)

Students Anxious As Interviews Begin

By FRANCINE COUNROS

The City College Placement Office announced the beginning of its Spring on-campus job interviews for engineering students on February 9. The outlook for this semester is again an optimistic one.

"In an effort to live up to the standards set by the January graduates, this June's graduates appear a little over-anxious and over-eager remarked Mr. Ernest

minded that most commercial companies are expanding at an increasing rate and that job opportunities are numerous.

Speaking about the class as a whole, Mr. Schnaebelle said the June graduates are well-prepared for the interviews and that they come well-dressed. He suggested that the best possible attire is a business suit.

Mr. Schnaebelle also commented on the January graduates. This group did remarkably well and the average salaries showed a definite increase over previous semesters. An increasing percentage of students are attending graduate school, especially in the field of chemical engineering.

NATIONAL SURVEY

Field	Monthly Salary 1st Period 1964-65	Monthly Salary 1st Period 1963-64
Chemical Engineering	639	608
Civil Engineering	609	586
Electrical Engineering	637	621
Mechanical Engineering	631	607
Chemistry	557	558
Physics	631	608
Math	567	584



Mr. Ernest Schnaebelle

Schnaebelle (City College Placement Office). Large groups of engineering students congregate outside the Placement Office every day, mobbing the office as soon as the doors open.

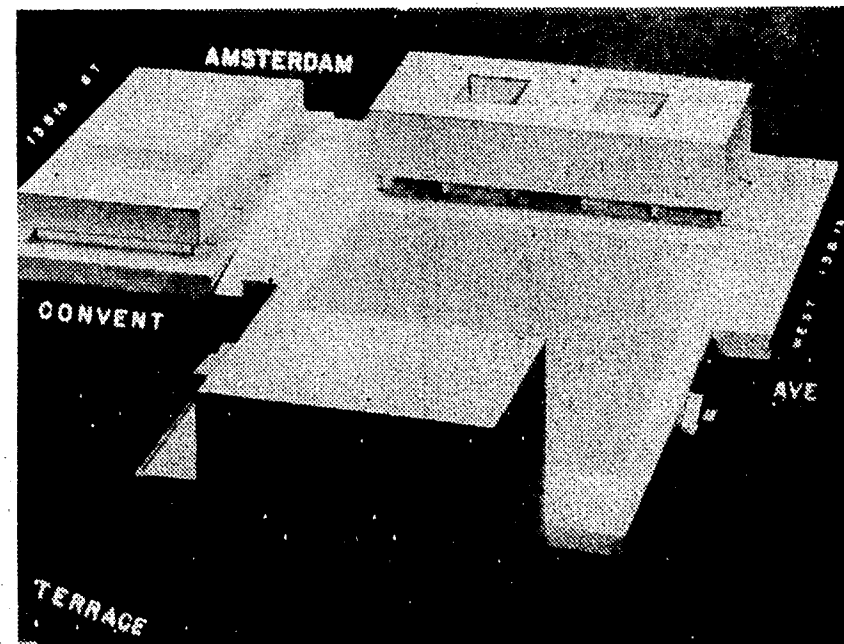
One interviewer remarked that the students seem nervous and uncomfortable. Students are re-

Architects Angry About Building Plans

By ARTHUR LANDSMAN, News Analysis

A \$40,000,000 construction project has been announced by President Gallagher which will help 'BRIDGE THE GAP' between the North and South Campuses. The project consists of the construction of a natural science building facing a human-

(Continued on Page 2)



"North Campus" as it will appear after completion of \$40,000,000 reconstruction project under Master Plan. White area shows proposed five-square-block plaza. In foreground is projected natural sciences building while underneath plaza will be physical and health education building and parking facilities. Building in center background is humanities and social studies building; structure at left background is college commons.

New Plan To Save Land

"Abandoned Mine Caves In!"
"Housing Development Sink-
ing!"

"Ground Subsidence Danger to
Area to Children!"

These headlines refer to a costly
and dangerous problem caused
by the collapse of ground over
underground mines — a disaster
which occurs often in many areas
of the country.

Two mining engineers from The
Pennsylvania State University to-
day reviewed one of the most
promising solutions to mine sub-
sidence to the American Institute
of Mining, Metallurgical, and
Petroleum Engineers at their an-
nual meeting in Chicago (Feb. 14-
18) — that of hydraulic backfill-
ing, the flushing of mine wastes
back into the mines. The speakers
before the AIME session were
Howard L. Hartman, professor of
mining engineering and Associate
Dean of the College of Engineer-
ing at Penn State, and his former
graduate student Frank A. Jera-
bek, now an engineer with the
Kennecott Copper Corporation,
Salt Lake City, Utah.

"Hydraulic backfilling is an ef-
ficient method of ground support
which helps to reduce pressure on
mine timber, minimize movement
of ground, control subsidence,"
the two engineers reported.

"When an excavation is started
underground, the existing equi-
librium is disturbed because a part
of the natural support has been
removed. The existing stress field
is disrupted, and stresses which
formerly passed through the por-
tion of ground now excavated
must now pass around the edges
of the excavation," they said.
"The rock must acquire a new
equilibrium, causing an elastic ex-
pansion of rock towards the free
faces of excavation."

Bad ground conditions, rock
bursts and ground pressures in-
creasing with the depth of mines
require a great deal of care in
shoring and supporting the mine
faces, they said. Over a period of
time the supports give way and
the mine caves in. Overlying rock
ruptures and the surface subsides.

The solution is to fill the mine
tunnels and shafts with coal wash-
ery refuse or mill tailings, the
mining engineer said.

But it's not all that simple.

Backfill can easily be regarded
as quicksand; if it does not com-
pact or cement, if insufficient
drainage is provided, the mass re-
mains a hazard to miners nearby
in connecting workings.

Still, mine backfilling can solve
the problem of subsidence in most
instances, the engineers said.

Architects Angry . . .

(Continued from Page 1)

ities building across a huge plaza which is to extend from
West 135th St. to West 138th St.
The Master Plan also calls for
the construction of a new Campus
Commons, a place for "meetin and
eatin," across from the High
School of Music and Art.

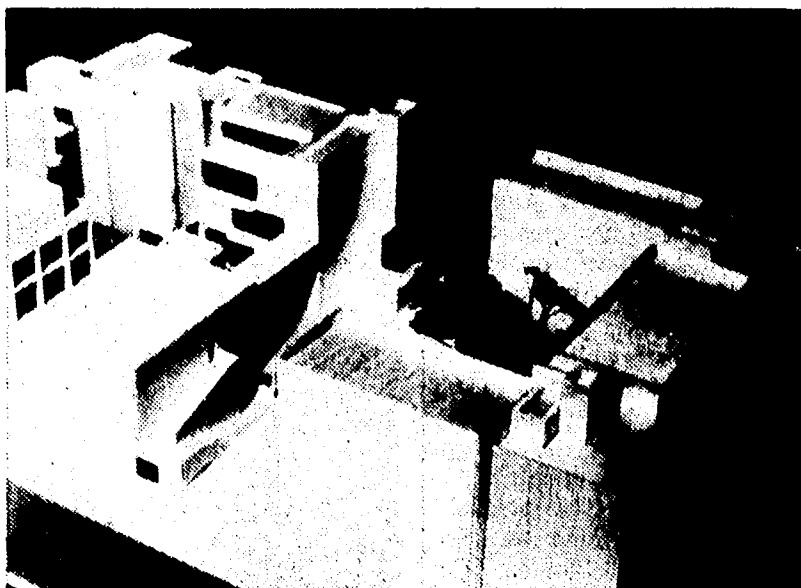
Two interesting questions have
presented themselves with the an-
nouncement of this Master Plan.

City College now has a well
established School of Architecture
with many competent architects
on its staff. Were any of these
men consulted in the planning of
this \$40,000,000 project? Was their
counsel sought for this scheme
which will alter the face and per-
chance the character of City Col-
lege? The answer is a resounding
NO! The faculty was informed of
the Master Plan only a few weeks

Just think what benefit was
lost to the students by neglecting
to ask them to submit designs,
under the direction of the archi-
tectural faculty, for the entire
complex as well as for individual
buildings.

The Board of Higher Education
would also have benefitted by the
presentation of various new ap-
proaches to the problem and
would thus be able to set forth
a solution after more careful
study and with greater convic-
tion that they have explored as
many possibilities as are feasible
given the limitations of time and
money.

I would like to quote two para-
graphs from an article I wrote for



Student Plan for New Plaza.

before the public announcement.
Whatever happened to the con-
cern for the waste of manpower,
of faculty morale, of close cooper-
ation between faculty and ad-
ministration?

Another interesting question
poses itself. Whatever happened
to the designs for the New Cam-
pus Commons building done by
the fourth and fifth year design
students of the Architecture De-
partment? (see Tech News Dec.
23, 1964). After viewing the Com-
mons designs President Gallagher
indicated that he was very im-
pressed with the imagination of
the students and the varied con-
cepts set forth as solutions to the
problem at hand. Photographs of
the best designs were submitted
to Dr. Gallagher at his request —
nothing has been heard of it since.

the Dec. 23, 1964 issue of Tech
News.

The . . . Students Commons de-
sign . . . project indicates a
coming of age for the Depart-
ment of Architecture. The Ad-
ministration now places suffi-
cient credence in the newest de-
partment of The School of En-
gineering and Architecture to
have it serve as an advance
planning agency for college
construction.

This close cooperation between
the College and the Department
of Architecture can serve in
bringing better architecture to
the college campus — an in-
gredient sorely lacking in the
last three additions to the cam-
pus.

I regret that this statement has
not proved to be true.

LIMITED TIME OFFER!



***10.00 PICKETT
SLIDE RULE**

WITH PURCHASE OF DESK RULE

A genuine Pickett, high-precision, pocket-size, all-
metal, 22 scale, log log speed rule can be yours
without cost if you buy a desk-size Pickett power-
log dual base 32 scale speed rule by June 20. Both
are the finest, most accurate slide rules made. Used
by top scientists and engineers the world over.
Genuine leather carrying case with each.

N-3 DESK RULE... \$19.88

POCKET RULE.....FREE

Offer expires
June 20th



Pickett
Twin Pack



CITY COLLEGE STORE

A ONCE IN A LIFETIME OFFER

Full Size Packaging of Most National Products Art Yours

While They Last!

up to \$15.00 VALUE

Cost You Only \$2.75

\$2.00 of Each Sale Goes to the Ass'n of Retarded Children

MEN'S CAMPUS PAC INCLUDES

OLD SPICE TALC, AFTERSHAVE LOTION, TALC
OLD SPICE SPRAY DEODERANT
SHORT CUT HAIR CREAM
SILVERKRIN SHAMPOO
SUCRETS GARGLE
SQUIBB TOOTHPASTE
MEDI-QUICK
BEAM EYEDROPS

WOMEN'S CAMPUS PAC INCLUDES

FRIENDSHIP GARDEN BUBBLE BATH
ANGEL FACE COMPACT MAKEUP
ANGEL FACE LIPSTICK
DESERT FLOWER HAND AND BODY LOTION
5 DAY DEODERANT PADS
POND'S HAND CREAM
SUN AND FUN SUN TAN LOTION
PRETTY PERM HOME PERMANENT
SQUIBB TOOTHPASTE — MEDI-QUICK
BEAM EYEDROPS

AVAILABLE ONLY AT THE CITY COLLEGE STORE

FACT-FILLED!

Now on Sale
"Indispensable"



**WORLD
ALMANAC**
\$1.50

896 pgs.

A million facts. 10,000 sub-
jects. Many new features.
Completely updated.

AT YOUR BOOKSTORE OR BY MAIL

Almanac, Dept. 347, WTS
125 Barclay St., N. Y. 10015

Send _____ Copies _____ Paperbound (\$1.60)*
_____ Copies _____ Clothbound (\$2.60)*
*(Includes 10¢ postage)

Total \$ _____ enclosed, SEND TO:

Name _____

Address _____

City _____ State _____

Fr Dev

This s
will enroll
offered to s
Architectu

The prog
of the tradit
grams given
man. It pro
in which ent
can be con
think about
ture respon
Hickey init
program in
offers the s
for field wo
tive develop
the theory,
eation of sp
niques desi
students "H
tient."

The pro
training in
dents who
discussion l
cussion lead
dent with
helping the
and gaining
in applying
techniques
been expos
Leadership

The dev
serves the
their entire
lege by offe
program. Th
that orient

If you
\$1
THIS

remem
this
interview
date

Goog

will hold
REGIST

Your Sum
will set up
your job i
And you r

EARNIN

Of the stu
2 out of 3
1 out of 2
1 out of 4

HOW T

1. Minimu
2. Have a
working
3. Pass a

Frosh Enrolled In Development Program

By JEANETTE ALTMAN

This semester sixteen incoming engineering freshmen will enroll in The Personal Development Program currently offered to students at City College School of Engineering and Architecture

The program is an elaboration of the traditional orientation programs given to all incoming freshman. It provides an environment in which entering college students can be continually motivated to think about their present and future responsibilities. Dr. John Hickey initiated this voluntary program in the fall of 1963. It offers the students opportunities for field work experience, executive development and training in the theory, philosophy and application of specific skills and techniques designed to enhance the students "Human Relations Quotient."

The program also includes training in leadership, using students who have volunteered as discussion leaders. Being a discussion leader provides the student with dual opportunity — helping the incoming students, and gaining practical experience in applying the principles and techniques to which they have been exposed in the Discussion Leadership Training Program.

The developmental program serves the needs of students for their entire tenure at City College by offering a nine semester program. The program recognizes that orientation is a continual

process and that successful adjustment requires constant learning, continual appraisal and frequent modification of one's thoughts, ideas, approaches and convictions.

The total Personal Development Program is planned to provide a continuing orientation to those students who are capable of thinking ahead and planning for success in a given professional area. There are about one hundred and fifty students enrolled in the program now including five girls. It is administered by a planning and coordination committee composed of students. The plans for the future will be determined at a general meeting of all participating students on Thursday, February 18 at 5 P.M. in 121 Finley.

Work Study..

(Continued from Page 1)

students to be affected by the program will be those attending classes in City College's evening division. "For such students, the opportunity for part-time employment under the work-study program may mean the difference between part-time attendance at night and full-time studies in the day session," he pointed out.

He said that students from the Negro and Puerto Rican groups will be particularly affected, and added that while the college keeps no record of race or national origin, "our estimates indicate that the ratio of minority-group students in the evening session to those in the day session may be as much as three to one."

Dr. Long declared that matriculated evening session students meet the same academic standards of admission as day session students "but are usually forced to attend part-time because of economic necessity."

Dr. Long said that the work-study program is one of a number of steps the college is taking to

(Continued on Page 5)

COMPUTER LECTURE PROGRAM SPRING, 1965

SERIES I

Tuesdays: February 16, 23, March 2, 9, 16
Time: 4:00 P.M.
Place: Shepard 306
Lecturer: Professor Demos Eitzer

SERIES II

Mondays: March 1, 8, 15, 22, 29
Time: 5:00 P.M.
Place: Shepard 306
Lecturer: Professor Ming Pei

SERIES III

Thursdays: March 11, 18, 25, April 1, 8
Time: 4:00 P.M.
Place: Shepard 306
Lecturer: Professor Demos Eitzer

SERIES IV

Wednesdays: March 17, 24, 31, April 7, 14
Time: 4:00 P.M.
Place: Shepard 306
Lecturer: Professor G. D. Brandt

Lectures are open to all members of the faculty and student body of the City University. No advance registration or formal enrollment is necessary. Please plan to attend a complete series. The series extends for five weeks.

Mechanical Engineers Only

Join Alpha Mu Epsilon

THE Social Fraternity

— S M O K E R S —

February 25 — 12-2

February 26 — 8:30 P.M.

— ENTERTAINMENT —

501 West 138th Street

If you need to earn
\$110 A WEEK
OR MORE
THIS SUMMER

remember
this
interview
date

Mar. 3

Good Humor

world's largest
ice cream specialties manufacturer

will hold on-campus interviews on this date.

REGISTER NOW!

Your Summer Placement Director or Student Aid Officer will set up an interview schedule for you. If you're selected your job is reserved until school closes. And you may start work as early as April 1st.

EARNINGS ARE BIG WITH GOOD HUMOR

Of the students working six or more weeks last Summer —

2 out of 3 earned \$110 or more a week

1 out of 2 earned \$118 or more a week

1 out of 4 earned \$133 or more a week

HOW TO QUALIFY FOR INTERVIEW

1. Minimum age, 18
2. Have a valid driver's license in State you'll be working, and be able to drive a "stick" transmission.
3. Pass a physical examination.

Equal Opportunity
Employer



— PLUS —

- Special rates for resort weekends, ski tours, outings.
- Discounts on clothes, appliances, furniture... and girls get 20% off at Larry Matthews.
- **ALL FOR JUST \$5⁰⁰ PER YEAR!**

JOIN NOW

**Society For
Business
Collegiate
Professionals**

**BRING THIS FORM
PLUS ONLY \$5.00
TO THE COLLEGE
STORE NOW!**

NAME (please print)
Address
City Zone State
Phone Age
☐ Male ☐ Female



TECH NEWS

Office — 335 Finley

Phone: 234-6500

EDITORIAL BOARD

CO-EDITORS-IN-CHIEF

RICHARD ROSENFELD · FRANCINE COURNOIS

BUSINESS EDITOR

Ellen Gottlieb

CIRCULATION MANAGER

Edward Smith

PHOTO EDITOR

Phil Burton

MANAGING EDITOR

Elaine Bogal

ASSOCIATE COLUMN EDITOR

Carl Weitzman

STAFF

Robert Bogursky

Enoch Lipson

Arthur Landesman

Abe Snyder

Jeanette Altman

Susan Yellin

Faculty Advisor — Dr. John D. Hickey

Editorial Policy of TECH NEWS is determined by a majority vote of the Editorial Board.

Printed by: Boro Printing Co.
216 W. 18 Street

222

Inquiring Technographer

By PHIL BURTON

QUESTION: Do you think in-class finals are to the benefit of students?

WHERE ASKED: South Campus.

Charlotte Kauffman, English/Biology, Lower Junior. If you want a "pat" answer here, you're not going to get it from me! This is because I think that whether or not this system is good depends upon the courses you have — which depends on your major. For some it means more time to study, for others it means all the finals being piled together. The first alternative also means more time to worry, the second might mean getting done earlier. However, in my case, many instructors gave us an extra week of classes before the formal finals so that I'd be better off with things the way they were formerly.



Kaufman



Klausner

Rita Klausner, History, Upper Soph. I like the idea of in-class finals because your own instructor is the one to make up the content of the exam and consequently you know what is expected of you. On the other hand, the departmental final can be more difficult and tricky because they are interested in maintaining certain high standards of scholarship.

John Karpik, Russian Area Studies, Upper Junior. In-class finals are more beneficial than departmental finals but classes which do not give in-class finals should not meet during the in-class finals week. Perhaps a week between classes and finals would also benefit students who find they have to study for five or six finals and at the same time finish term papers.



Karpik



Altman

Jeanette Altman, English, Upper Soph. The advantage of in-class finals is the fact that each teacher tests the students on the material covered in class. Unfortunately the school does not give the students enough time to prepare for them. I think, nevertheless, that most students do better on in-class finals than on the rigid tests composed by the heads of departments.

Mati Kuusmae, History, Upper Freshman. The concept of in-class finals is good because it accurately reflects the class work more than a uniform examination. But unfortunately, this system was abused last term with gym classes and other nonsense during the week. Undoubtedly this led to many undeserved marks for many last term.



Kuusmae



Landsberg

Nickolas Landsberg, Civil Engineering, Upper Soph. They are both a help and a hindrance. The finals given by an instructor in class are likely to be easier than a departmental exam. On the other hand, you have less time to study for them. I would prefer a few days of "grace" before exams which would give me time to study for all finals. The teachers ostensibly are not supposed to hold recitations during the week that in-class finals are given if there is a departmental exam in that course but this system has been abused by many instructors who make this their own week and do require the students to come at this time. A new plan should be figured out which would be fair to all students and would end such abuses.

Negro Challenge

"The most important single leverage to help Negroes is the expansion of job opportunities," says Eli Ginzberg, editor of "The Negro Challenge to the Business Community," published today by McGraw-Hill. "Business is the most important single institution to assist the Negro," Professor Ginzberg continues, "and employment is the key to the full integration of the Negro into American society. This is the central theme of the book."

The fact that 60 representatives of leading American companies met at Arden House this past January for a conference at which six experts discussed different aspects of the present Negro challenge to American business was an indication of the increasing understanding by the leaders of industry of their responsibility in the broad-scale national efforts to assure that all Negroes participate fully in American life.

The first topic taken up in "The (Continued on Page 5)

Viet Nam

Last week Student Council wisely postponed consideration of a motion expressing the concern of that body over the retaliatory air strikes of the United States Government in Communist Viet Nam. It did so over the protest of its author, Stephen Cagen '65, who, in his maiden speech declared "we must discuss this tonight, because there may be a war within twenty-four hours." President Zippert replied that, if indeed there was to be a war within twenty-four hours, there was little that Council could do in the "intervening time."

The future of Student Government is dim indeed, when freshman members, encouraged by a record of Student Government irresponsibility add to that drained body's discord.

The issue before Student Council tonight is not war or peace: it is whether an extra-curricular service organization, paralyzed by a term of irrelevant guerilla raids in the fields of foreign and national affairs, can sensibly regain its sense of proportion.

Council has already, the legitimate functions of allocating a thirty-thousand dollar budget, lobbying for a realistic curriculum revision, and coordinating the burgeoning activities of several hundred clubs, just to mention a few of its myriad, sometimes tiresome, but always necessary, functions. It is time to devote to these responsibilities the attention they deserve.

The time to wipe the slate clean is tonight. We urge Mr. Cagan, with all respect to his civic concern, to consider the practical consequences of his motion.

Master Plan

President Gallagher has revealed the "Master Plan" for the physical expansion of City College. The program proposes three new buildings and a large multi-purpose plaza.

We are hopeful that these structures will satisfy the needs of a growing student body. We feel, however, that this end could better have been served had the Architecture Department of City College been consulted. Not only would there have been a financial saving but a more personalized understanding brought to the planning.

The qualifications of the Architecture Department were made clear in December, when models for a Student Commons to be built on the site of Klapper Hall (the same site as in President Gallagher's plans) were exhibited. These structures were designed by fourth and fifth year students at no cost to City College. At that time Dr. Gallagher stated that he was very impressed with the work of the students.

The close cooperation between the administration and the Department of Architecture desired at that time has not come to fruition. Collaboration of this kind might have saved the last three additions to the campus, Cohen Library, Steinman Hall and the Administration Building, from being the graceless creations they are.

We hope that the release of detailed construction plans for the proposed project will not reveal three more characterless conglomerations of steel, glass and reinforced concrete which are indistinguishable from office buildings and industrial plants.

ELECTRICAL ENGINEERS

PHYSICISTS

MATHEMATICIANS

Technical representatives of The MITRE Corporation will be conducting interviews on campus

February 23, 1965

MITRE is chief technical advisor and systems engineer to the Air Force Electronic Systems Division of the Air Force Systems Command. In this capacity, we design and develop such global, computer-based systems as the NORAD Combat Operations Center, Back-Up Interceptor Control System, and the Nuclear Detonation Detection and Reporting System. Other commitments: development of a future air traffic control system and supporting the Defense Communications Agency in the development of the National Military Command System.

For the young systems engineer, this is uniquely rewarding work. You associate with the top men in your field. You work in an atmosphere that allows you to extend your capabilities professionally and academically.

At MITRE, men trained in single disciplines are encouraged to grow beyond their original fields of interest. Systems designers learn to work from an increasingly broad base.

You may work in such diverse areas as information theory, computer design, display techniques, propagation, or human engineering. You may analyze. You may synthesize. You may deal with systems or individual components. At the highest levels, you may have to consider political, economic and social factors... as well as the available and predictable technology.

Requirements: M.S., or Ph.D. in these disciplines — electronics, physics, mathematics. MITRE is located in pleasant, suburban Boston and also has facilities in Washington, D. C. and Colorado Springs. If an interview will be inconvenient, inquiries may be directed in confidence to Vice President — Technical Operations, The MITRE Corporation, Box 208, Dept. CNI, Bedford, Mass.

ARRANGE FOR AN INTERVIEW THROUGH THE PLACEMENT OFFICE.

THE
MITRE
CORPORATION
An Equal Opportunity Employer

Pioneer in the design and development of command and control systems, MITRE was chartered in 1958 to serve only the United States Government. An independent nonprofit corporation, MITRE is technical advisor and systems engineer for the Electronic Systems Division of the Air Force Systems Command, and also serves the Department of Defense, and the Federal Aviation Agency.

Engineering Week

February 21-27

A message from President Johnson during National Engineering week.

ENGINEERING FOR HUMAN NEEDS

The position of the United States as the foremost industrial power rests, in considerable measure, on technological leadership. Our engineering prowess is second to none — and we must keep it that way.

In the past, the American engineer has contributed much to the reservation of national well-being and security. New horizons beckon to us beneath the sea, in space, and in the interior of the earth. The greatest of the challenges presented will be related to improving the life of man. Better housing, modernization of transportation, freedom from the hazards of air and water pollution, greater control over the destructive forces of nature, and the establishment of a new and attractive urban environment must all be realized as we advance toward the Great Society.

During National Engineers' Week, I ask the members of this profession to assist in meeting these challenges by dedicating themselves to an even more active interest in our young people who will bear the engineering responsibilities of the future. Many high school students and particularly the children of disadvantaged families are unaware of engineering career opportunities and often fail to obtain a sound preparation or college study. The engineering societies and their membership can help to remedy this situation by providing guidance and disseminating information to students, parents, and school counselors. By thus nurturing technical talent in America's youth, you will be contributing significantly to the building of a better society.

President Johnson

In honor of engineering week Tech News is beginning a series of opinions by prominent faculty members. The first of these opinions is written by Professor Henry T. Updegrove, Chairman of the Department of Mechanical Engineering.

CHAIRMAN URGES FULL-TIME GRADUATE WORK

To: New Students in Engineering (and any other students within earshot).

Let us face a fact. There is no doubt that one of the principal reasons for your presence here is the folklore estimate that possession of a B.S. degree bestows an advantage estimated to be worth more than \$200,000 during your lifetime. Perhaps this figure may be valid in comparison to the potential of a high-school drop-out, but with an ever increasing fraction of high-school graduates going on to higher education, where the advantage? Face it, the B.S. degree carries the weight today that was enjoyed by the high school diploma forty years ago, before the "Great Depression."

If your aim is to achieve such advantage, you must set your sights up to a graduate degree and proficiency in some marketable "skill." A graduate degree today, will give you the relative advantage over a B.S. degree that the B.S. degree enjoyed over the

high school diploma forty years ago.

In engineering, the "state of the art," with the advent of the "space age," has expanded to the point that four years study and a B.E. degree is not enough. To move up in the profession you will need more education. You have two choices. You can take employment and continue part-time in the evening, or you can remain in school full-time.

Part-time graduate work permits earning a living and most usually the employer assists in paying the tuition. This is attractive, if you are insistent upon being grown-up and having a family, but your limit will most likely be the Master of Engineering degree. The Doctoral degree will require some full-time work which will most likely be out of your reach with family responsibilities.

Since full-time graduate work will be necessary to complete the Doctoral degree, it will require that you suppress your urge to become a family man for another four or five years. There are available many opportunities for financial support in amounts sufficient for a single person. The advantages of possession of the Ph.D. are great.

If you are earnest in your objective to prepare yourself to the limit of your capabilities, the time to plan is now.

The first order of business is to achieve a top record in reaching the Bachelor's degree. Welcome and support in the Doctoral program will be for students who show potential for success. The best measure of this potential is your standing in your class. In other words, keep your "nose to the grindstone" and adjust your way of life to doing your best scholastically. Much is made of the need for rounding the personality and social adjustment as part of the education process. This is important, but it is advisable to be a "late bloomer" socially and achieve your educational goals first. You will be truly outstanding if you can do both at the same time, but don't assume that you are one who can do it.

Plan to retain your momentum. If you have reached the top in your undergraduate years, keep on going in school at all costs. Decide on the field of advanced study you desire and investigate the opportunities for support. Remember that once you leave full-time school work the likelihood of returning is small.

Henry T. Updegrove,
Chairman

Work Study..

(Continued from Page 3)

encourage college aspirations among minority group youngsters with academic potential. Its Social Dynamics Research Institute is evaluating a "college discovery" program sponsored by the City University. The University's discovery program is geared to provide remedial work for promising youngsters from deprived groups who cannot meet admission requirements to the city colleges because of inadequate preparation at the elementary and secondary school levels. In addition, some 150 City College students are serving without pay in volunteer tutorial programs for Harlem youngsters.

NOTICE TO ALL STUDENTS OF ENGINEERING AND ARCHITECTURE

Many of you are eligible for the prize and/or scholarship listed below. Applications will be welcomed by the Committee on Awards.

An application blank may be obtained from Mrs. Herring, room 201, Goethals Hall. This should be filled in and returned before March 20 (or before April 15 in the case of the Lubetsky Scholarship).

Frank A. Rappolt, Chairman
Committee on Awards

ELIZA FORD PRIZE

The income from a principal sum of \$5,000 will be paid each June to that student of the School of Engineering and Architecture who is most generally deserving and who shall have done the best work during the period of two years preceding the award. This prize was established in 1921 in memory of Miss Eliza Ford, a faithful and efficient public school principal in Brooklyn.

In selecting the winner, the Committee on Awards interprets "best work" to include both scholarship and extra-curricular activities.

BENJAMIN LUBETSKY

MEMORIAL SCHOLARSHIP

The Benjamin Lubetsky Memorial Scholarship is awarded each year to a deserving full time student of engineering in need of financial aid.

Club Notes

TO ALL ENGINEERING STUDENTS

The first meeting of TECH COUNCIL will be on Thursday, February 18 at 5 P.M. in Room 337 Finley. Please send a representative.

CHESS CLUB

Tournament registration will continue in 307 Finley at 12:15. Everyone is invited. All entrants will receive at least one prize.

AIAA

AIAA will hold a joint meeting with ASME in Room 102 Shepard. All interested students are welcome. Thursday, February 18, 1965, 12:30.

ECONOMICS SOCIETY

The Economics Society will hold its organization meeting on Thursday, Feb. 18 at 12:30 in W107. All are welcome.

HILLEL

Jesaja S. Beru, the National Executive Secretary of the Israeli Association will speak on "American and Israeli Jewries — Their Interrelationships," followed by student commentators at Hillel House, 475 West 140 Street.

YOUNG REPUBLICANS

The Young Republicans meet tomorrow in room 335 Finley at 12:30 P.M. to recover and revive from November. Agenda will comprise staring listlessly at blank wall and slowly turning to face reality.

Negroes...

(Continued from Page 4)

Negro Challenge to the Business Community" is American Democracy and the Negro. Here editor Ginzberg traces the counterpoint between American democracy and the Negro people. In opening he notes:

"One conspicuous strength of American democracy has been its ability to take all kinds of people, put them through similar experiences, and absorb them with little difficulty. But the Negro, who arrived in America in 1619 and therefore has been here longer than the Pilgrims, has not been absorbed by our democracy. His experience has been different from that of all other groups."

Professor Ginzberg then discusses the major turning points in the Negro situation here: the end of slavery, World War I which accelerated the movement of Negroes out of the South and into Northern Industry, World War II with its aftermath of prosperity which consolidated the wartime gains, and the 1948 election when, for the first time, the Negro vote resulted in their gaining a significant degree of political power. Thus he shows how we got where we are today, precisely where we are, and what alternatives we now face.

Charles E. Silberman of the editorial board of *Fortune* Magazine, writing on The Economics of the Negro Problem, is the second contributor. Among the important facts which he emphasizes is that the basic approach Negroes are now taking to redress their grievances is political — the use of power. "Every other ethnic group," he points out, "has made its way up into the middle class through group pressure, through political activity, through the use of power. . . . It is a little late in the history of the United States suddenly to change the rules and say to the Negro that although others have helped themselves by group activity you must make it on your own as individuals."

Space Jobs...

(Continued from Page 1)

years ago. This, however, may go down as the year for chemical engineers. In terms of percentage gains in beginning salary offers, they are in top position on all three degree levels. In the bachelor's phase of the study, average offers to chemical engineers have gone up 3.9 per cent since June of 1963-64. Actual offers have varied from a low of \$601 a month to a high of \$677 within the 80 per cent range of offers used in computing the data. Master's candidates in chemical engineering experienced an increase of 2.5 per cent, with a low of \$710 and a high of \$772, while doctoral candidates gained 2.9 per cent, with low-high figures of \$991 and \$1,073.

The current ranges for other leading bachelor's-level groups are electrical engineering, \$586 to \$688.

Although the number of offers is not too substantial and the picture may change later in the season, construction and building materials employers are notably higher than any other employer group in rate of increase in average monthly offers — going up 7.2 per cent since the close of last year's recruiting season. Their offers this year have ranged from \$521 to \$693. In most types of employer categories and most curricula, however, the increases have tended to be moderate.

On the subject of Jobs and Income, Whitney M. Young, Director of the National Urban League, describes many ways in which his organization and others have helped fit Negroes, at various levels of skill, into jobs for which they might not, on their own initiative, have been acceptable. He suggests that these groups can help businesses integrate successfully and that the present peaceful Negro leadership can hold authority only so long as they can win victories for their followers.

Kenneth Clark, a leading Negro intellectual, Professor of Psychology at City College, New York, probes into the lower depths of White and Negro alike in his discussion of The Negro in Turmoil. He points out that "a segregated society not only damages people but, in a curiously debilitating way, also protects them. . . . The worlds of the segregated society protect mediocrity, inferiority, apathy, and personal inadequacies." Thus, as desegregation progresses, "The problems of adjusting will not only be difficult for Whites but in various insidious ways quite difficult and disturbing for Negroes."

"The Negro Challenge to the Business Community" is priced at \$4.95, hardcover. Paperback edition is \$1.65.

MATHEMATICIANS PHYSICISTS ELECTRICAL ENGINEERS

LINCOLN LABORATORY
has openings for a
limited number of en-
gineers, physicists and
mathematicians.

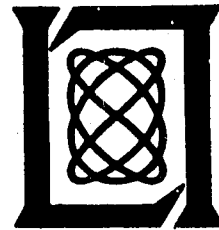
LINCOLN LABORATORY,
a research center of the
Massachusetts Institute of
Technology, is engaged in
research and develop-
ment in advanced elec-
tronics, with emphasis on
applications to national
defense and space
exploration.

A LABORATORY REPRESENTATIVE
WILL INTERVIEW APPLICANTS

FEBRUARY 23

CONSULT THE CAMPUS PLACEMENT
OFFICE IN ADVANCE

LINCOLN LABORATORY
Massachusetts Institute of Technology



BOX 21 • LEXINGTON 73
MASSACHUSETTS

INDUSTRY TODAY

A new radar development that provides 3-dimensional performance with a sharp reduction in size and weight compared to existing systems was announced today by the Radio Corporation of America.

The development, achieved at RCA's Missile and Surface Radar Division, Moorestown, N.J., could lead to easily transportable, quick-reaction radars for air search, surveillance, and aircraft approach control, according to Louis Swartz, project manager.

Mr. Swartz said the size and weight reduction — sufficient to make the radars helicopter-transportable — is possible through application of interferometer principles to radar techniques. A working model of the interferometer antenna and feed system, he noted, was built and proven by RCA.

Mr. Swartz explained the interferometer principle as the interaction, or interference, in space between radar beams emitted from a pair of radiation elements in the antenna. The interaction of the two beams in space causes alternate canceling of the transmitted energy, forming nulls or energy voids, and creating of strong equal fingers or lobes. As an aircraft flies through this plane of lobes and nulls, the radar figures out in which lobe the aircraft appears and very accurate elevation angle is achieved.

"Put very simply, the interferometer radar reaches out into space with a giant hand with many fingers extended in a vertical plane. When an aircraft hits one of these fingers, we know in which finger it is and therefore know the elevation of the aircraft," Mr. Swartz said.

Mr. Swartz said the interferometer principle can produce 3-D radars weighing less than 6000 pounds compared to 20,000 to 40,000 pounds for conventional radars accomplishing the same mission. The radar, less antenna, is housed in one shelter only 7 feet high, 7 feet wide, and 12 feet long, much smaller than other systems.

He said that a radar is considered 3-dimensional when it determines target elevation as well as range and azimuth, or horizontal movement. The interferometer radar provides elevation with an accuracy of plus or minus 1,000 feet at 100 miles range, he reported.

He said the RCA interferometer antenna weighs only 350 pounds and measures only 15.5 feet in height, compared to much heavier and larger conventional models.

Mr. Swartz provided this additional technical data on the RCA 3-D interferometer radar:

The interferometer antenna assembly comprises 3 identical feeds, all rotating as a unit in azimuth, which illuminate the antenna's parabolic cylinder reflector. The parabolic contour forms the beams in azimuth, and the contour of the feeds provides a shaped beam in elevation for efficient illumination of the desired vertical coverage in space. Only one feed is used for transmission.

During reception, the three feeds provide both a fine and coarse interferometer. The top and bottom feeds produce the fine interferometer. The top and middle feeds produce the coarse. The middle feed is split in azimuth, but its received signals are instantly combined to perform the function of a single feed.

SHEAFFER.

DOLLAR SPECIAL

BALLPOINT

FREE extra 79¢ king-size refill

\$1.79 value

\$1.00

ONLY

Lecture notes will flow as quickly as your professor's thoughts. Genuine Sheaffer precision ballpoint glides along, always keeps pace, with smooth-as-silk writing. Red, blue, green or clear crystal barrels let you check your fluid supply. Fine or medium point. And with an extra refill in addition to the one in the pen, you'll write miles without refilling!

CITY COLLEGE STORE

DOUBTING THOMAS?

HOPEFUL AGNOSTIC?

Christianity has more to offer than hope, it has positive proof in the form of a MIRACLE which was foretold, described and is intensely personal. Ask the Religious Leaders or send me a card marked ESP-17. My reply is free, non-Denominational, Christian. Martyn W. Hart, Box 53, Glen Ridge, N.J. 07028 (USA).

GROW WITH A GROWING COMPANY

Brooklyn Union Gas, one of the leading companies in the dynamic gas industry, offers outstanding potential for individual growth. Our 35-week formal training program is designed to start new graduates on a career with our company.

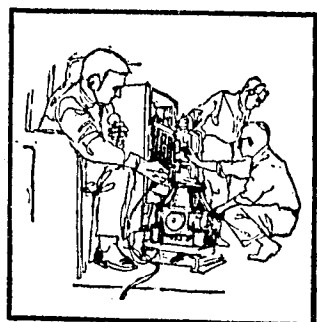
If you will be a 1965 graduate in Engineering (civil, industrial, mechanical, electrical, chemical), Accounting, Mathematics or Business Administration, ask your Placement Office for a copy of "Launch Your Career with Brooklyn Union", and register for our campus interview date on March 10.

Good starting salaries, excellent working atmosphere in the great City of New York, many benefits including tuition aid up to 100 percent for students interested in furthering their education.

THE BROOKLYN UNION GAS COMPANY

195 Montague Street, Brooklyn, N. Y. 11201

Engineering & Science Degree Candidates — BS, MS, PhD



At General Precision Aerospace

**You'll
Train
on
the
firing
line**

At General Precision Aerospace the young graduate steps right into actual space engineering assignments. During his first year he works on many projects in several departments through a rotational training program and under the close supervision of experienced professionals (many are former training program grads). It's the best way we know of to broaden his exposure and help him find where he fits best in our multi-faceted space effort.

This effort is so broad... it's hard to find a major space and defense program that doesn't use GPA precision guidance and navigation instrumentation: Apollo, Explorer, Gemini, OSS, Mariner, Polaris, SUBROC, Surveyor, Ranger, and LEM. A complete list would fill this page.

Looking ahead — and the research and development behind it — is our prime business. Visionary programs now in progress will someday yield optical laser gyros and accelerometers, stellar inertial guidance systems, maneuverable re-entry guidance and control systems, strap-down inertial guidance systems, precision microminiature inertial navigation systems, solid state sensors, complex space information systems for spacecraft, missiles, and aircraft.

Down-to-earth expansion programs shore-up these ambitions. A multi-million dollar equipped Research Center in Little Falls, N. J. was completed in 1962. An extensive Systems Engineering Facility was put into operation in late '63. All together the GPA facility represents 1,500,000 square feet of the most advanced equipment complexes in the East devoted to research, development, and production of systems for aerospace.

Initial Assignments Available in:

KEARFOTT DIVISION—Electronic Systems & Equipment • GSE • Microelectronics • Digital Data Handling Systems • Electro-optics • Precision Gyros • Gyro Reference Platform • Analog Computers • Digital Hybrid Computers • Electrohydraulics • Synchro Resolvers and DC Devices • Gimbal Mounted Components • Servo Motors and Tachometers.

SYSTEMS DIVISION—Inertial and Stellar Inertial Guidance • Adaptive Flight Control • PCM Telemetry • On-Site Flight Test • Guidance Systems Test Analysis • Trajectory and Targeting Analysis • Error Analysis • Scientific Programming • Aerospace Ground Equipment • Radiation Systems • Astrosensors • Digital Systems.

CAMPUS INTERVIEWS: Friday — March 12

Arrange an appointment with your Placement Director now. Or write to College Relations Supervisor.



**GENERAL
PRECISION
AEROSPACE**
GENERAL PRECISION, INC.

**KEARFOTT DIVISION
GPL DIVISION
SYSTEMS DIVISION
RESEARCH CENTER**

An Equal Opportunity Employer

BOOK REVIEW

ASME Handbook: Metals Engineering—Design, Second Edition. Edited by Oscar J. Horger, Chief Engineer, Railway Division, The Timken Roller Bearing Company. Sponsored by the Metals Engineering Handbook Managing Committee of The American Society of Mechanical Engineers. Prepared by a staff of specialists. 605 pages plus index; 7 1/4 x 9 7/8; 624 illustrations; McGraw-Hill SME Handbook Series. \$22.50. Publication date: February, 1965.

The "ASME Handbook: Metals Engineering — Design," Second Edition, is a comprehensive and practical guide to the design function in metals engineering. It covers the selection of materials; properties of metals; the effects of such processing operations as coating, cold working, or welding; and non-destructive test methods. A special section covers design practice, working stresses, the use of strain gages, surface finish requirements. The Second Edition of the handbook is half again as large as the First, and contains many new and revised data. The chapters covering the following topics have been completely rewritten: selection of material and the sig-

nificance of mechanical properties data; overstressing and understressing fatigue; shot peening and case carburizing; riveted and welded structural joints; the relation of friction and also shock and impact to design; magnetic particle inspection and strain gages; and ceramic brittle coatings.

Completely new chapters have been added on internal combustion engines, gas turbines, and rocket engines; low temperature properties and brittle fractures; thermal stresses; elasticity, radiation, and electrical properties; the design of experiments; and a host of others.

"ASME Handbook: Metals Engineering — Design" is one of four companion volumes sponsored by The American Society of Mechanical Engineers and known collectively as the ASME Handbooks. The others are "Metals Engineering — Processes," "Metals Properties," and "Engineering Tables."

A staff of specialists contributed chapters to the Handbook, working under the over-all editorship of Dr. Oscar J. Horger, Chief Engineer of the Railway Division of The Timken Roller Bearing Company, Canton, Ohio.

Further information on the "ASME Handbook: Metals Engineering — Design," Second Edition, may be obtained from the McGraw-Hill Book Information Service, 327 West 41st Street, New York, New York 10036.

Notice To Engineering Students

All Engineering and Architecture Seniors and Juniors must have their Fall Term 1965 Election Cards approved in Room 205 Administration Building. Any change from the original choice of courses will require reapproval. Election Cards should be brought to the Office of Curriculum Guidance according to the following time table.

Feb. 8-11 Seniors
Feb. 15-19 Juniors

Any Sophomore or Freshman who has indicated on his Fall Term Election Card that he is planning to enroll in at least one engineering, Graphics or Architecture course must report to Room 205 A during the period between Feb. 23rd to Feb. 26th for official approval of his selections.

Any other Sophomore or Freshman, who is not planning to register for at least one course in the above mentioned areas in the Fall Term 1965, is required to file an Election Card in the Registrar's office (A110). The absolute deadline or filing cards is Monday, March 1, 1965.

Courses to be taken in City Summer Session and in the Fall must be indicated on the card. The section letters for Summer school courses must be included. The tentative schedule, for the summer and fall terms, is posted outside Room 201 Administration Building, and also, outside the City Session Registrar's office. If a student plans to register at another school for summer session, must see Dean White during April, for approval.

This term, for the first time, approval is required for any course given in graphics, in addition to approval for the usual architecture and engineering courses. Graphics is offered by the School of Architecture, and the required approval will enable us to acquire a complete list of all courses offered in this department.

Coming: February 24 & 25, 1965

HUGHES announces campus interviews for Electronics Engineers and Physicists receiving B.S., M.S., or Ph.D. degrees.

Contact your Placement Office immediately to arrange an interview appointment.

*Or write: Mr. Robert A. Martin
Hughes Aerospace Divisions
11940 W. Jefferson Boulevard
Culver City, California 90232*

Creating a new world with electronics

HUGHES

HUGHES AIRCRAFT COMPANY

U. S. CITIZENSHIP REQUIRED
An equal opportunity employer.

discover the difference '65 Chevrolets

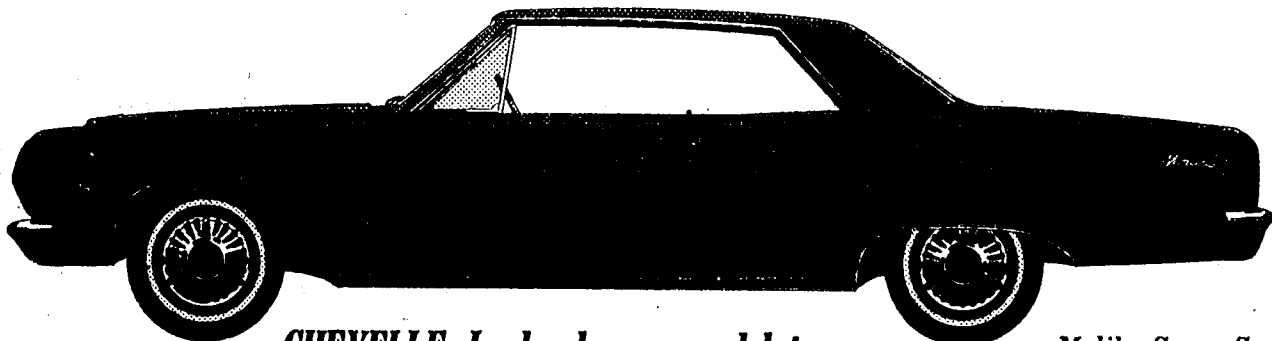
Impala Super Sport Coupe



CHEVROLET Redecorate your driveway

Park out front, at least for a while, and let the neighbors enjoy that sleek Impala Super Sport styling. After all, you have everything else to yourself: the luxurious Super Sport interior with its cushy bucket

seats, center console and carpeting; the smooth and easy Chevrolet ride; and Chevrolet power, starting with our famous 140-hp Turbo-Thrift 230 Six. This '65 Chevrolet's a home improvement if you ever saw one.



CHEVELLE Looks, luxury and lots more

Malibu Super Sport Coupe

The looks you can see. The luxury that's a Malibu Super Sport you can imagine: bucket seats, full

carpeting, patterned vinyls and eight interior color schemes. The rest you'd better sample for yourself.



Monza Sport Coupe

CORVAIR Everything's new but the idea

The idea still is, make Corvair the sportiest low-priced car this side of the Atlantic. So look: suave new continental styling, even better handling, same rear-engined traction. Driving's fun. Try it.

Drive something really new—discover the difference at your Chevrolet dealer's
Chevrolet • Chevelle • Chevy II • Corvair • Corvette



ARCHITECTURE

By ENOCH LIPSON

As past columns have discussed the architectural form of our cities, we might now consider the history of that art. Architecture, as any art form, is inseparable from the society of which it comes. Therefore, in tracing the historical development of the pattern of the city, we will continually refer to two major determinants, first — the political relationship of the city and its neighbors — WAR.

We quote Plato, "In reality, every city is in a natural state of war with every other."

This natural state led to the development of moats, walls, and street patterns.

All cities were eternally at war and yet they may still be divided rather easily into two groups which might be called the ordered and the organic. The difference between them is caused primarily by the second major determinant, the internal political system. Organic cities grow over long periods of time; they are almost always very functional and exceedingly beautiful (admittedly an outrageously qualitative statement in an historical analysis), each facet having long been tested and found true. Ordered cities, on the other hand, were built, not grown. They were, and still are, conceived as complete entities, as works of art to be finished within a specified length of time. While the organic cities are ruled by "democratic means" (a large governing class, reasonably representative of the population) or-

dered cities require autocratic rule for their construction and maintenance. Here, in the city of the God-King, the dictator, the colony builder, one finds the dramatic approach, the triumphal road, the arch, and the rigid, geometric, symmetrical plan.

Both types of city appear very early in history and at rather low levels of technical sophistication. The ancient city of Ur (illustrated by an aerial photograph of modern Marrakesh), existing at 2000 B.C., is one example of an organic town. A city of 25,000 people in some 200 acres, it consisted almost entirely of two story brick homes of the inverted type still popular around the Mediterranean. The narrow streets or alleys, they were only eight to ten feet wide, had no definite pattern; many were dead ends, narrow fingers penetrating a solid mass of domesticity. The narrow streets kept out both the hot sun and rigid social control. In such quarters armies of police could be routed by a few old ladies with full chamberpots.

The city of Babylon furnishes an interesting contrast. Like Ur, it was situated on a plain of earth and clay. Brick again forms the primary building material and the style of building is similar. According to Herodotus — who unfortunately saw only the ruins — the city was a square 120 furlongs or a mile and a half on a side. It was surrounded first by a broad moat and then a high, wide wall of brick, broad enough to

hold rows of one room houses and still leave a road for a four horse chariot. The Euphrates river divided the city, with the separation increased by the addition of a wall on each side of the river. The street pattern formed the rectangular grid common to "God-King" cities and the entire city was further divided into quarters by two major perpendicular intersecting roads. The processional road is an important feature of the ordered city, it makes spectators, rather than participants of the inhabitants and facilitates the rapid movement of troops. The rectangular grid makes census taking, tax collecting, and police enforcement easier; it lends itself to real estate speculation and easy subdivision and sale. Most importantly, it appeals to the pseudo-sophisticate esthetically and politically because its design is so easy to grasp and apply.

The origins of this system, the simple grid, were probably military. Army camps still follow the same pattern. In Egypt we find that it was put to a similar use. When each pharaoh had decided upon his burial spot, he would establish a temporary city for the workmen. Their plan was similar to that of an army camp or New York City above Fourth Street. The side streets were perpendicular to a wider main street, perhaps twenty feet across. Each long narrow block was solid, that is the buildings had no back yards, but rather interior courts. This is typical of the Mediterranean as opposed to the North European towns.

Although a city may begin as either ordered or organic in form it will adapt in response to a

changing political atmosphere. Changes from organic to ordered forms however, tend by then nature to be rather sudden and cataclysmic. The opposite process occurs by a rather gentle erosion, or rotting, depending upon one's point of view.

In Rome the original organic plan was imposed upon first by the Imperial government and then by the Medici Popes. The changes were such as to indicate again that the role of the ordinary citizen had lowered from that of participant to spectator, from doer to observer. The parade wide boulevards and huge triumphal plazas all date from autocratic times.

The reverse process occurred in many of the colonial towns established by the classical powers. These colonial towns, established under autocratic rule, often relaxed into more organic forms as the empires died. The Roman towns, of which hundreds were built, are probably the best examples of this. They were all laid out in a military pattern of rather small square blocks with two main streets (North-South, East-West) intersecting in the center. The streets were completely planned long before the towns were filled; in England many of the towns were never completely populated, so that the failure of the suburban type homes to hold the street line, destroyed the ordered effect. The Italian and French towns such as Florence, Piacenza, Modena, Naples, Turin, Turenne, Beauvais, Soissons and Trier lost most of their Roman characteristics during the medieval period, only a few traces of the square insulae remain.

Only the towns erected by the

English Kings in Aquitaine retained the ordered plan during the middle ages. Most of the new cities are loose and free. Symmetry and the grid disappear.

Of all the beautiful cities of the middle ages, Venice is probably the finest. It was founded in the fifth century A.D. by refugees from the city of Padua. No attempt was made to create grand streets nor ceremonial ways, indeed not until 1172 was the piazza San Marco even begun. The scale was kept intimate and human. Each parish had its own square, each section its own function. Of course the use of the waterway was also a brilliant solution to the problem of separating the pedestrian and traffic. The important aspect however is that of the citizen ruler. The man who took an active part in civic affairs, who walked in church parades (with no one watching except the women and children) is the builder and user of the medieval city.

Mr. Mumford undoubtedly idolizes them. Certainly he has adequate reasons. Their use of the topographic features of the land; their natural unity of design and their warm and human scale lend them beauty even today. The finest parts of our cities are medieval in design — for example, the financial district of Greenwich Village in New York.

During the medieval period, the king and the city were allied against the lords of the manor. Royalty fought on the side of the bourgeoisie against the nobility. One might, in this sense, consider the Magna Carta a reactionary document.

If your roommate
says the Bell System helped invent
hi-fi, stereo and talking movies,



don't bet. You'll lose.

In the course of their studies of the nature of sound, Bell System scientists have been able to make significant contributions to all three forms of entertainment.

You might say that it was because the discoveries were there to be discovered by the first explorers to come down the trail.

When the century was still young, we realized that if the telephone were to come up to its potential, the nature of sound had to be much better understood than it was then.

This led to the largest, most comprehensive

study of sound ever undertaken by anyone.

To capture sound for study, Bell Telephone Laboratories developed the first electronic recorder for phonograph discs. For the first time, performers recorded into microphones.

Then, in 1925, Bell Labs perfected an electronic system that synchronized sound and action on movie film. The talkies were born.

To get better sound reproduction, they started experimenting in 1933 with ways to separate high and low frequencies to prevent distortion. The result was a single-groove,

multi-channel disc—the basis of today's stereophonic industry.

Nevertheless, these contributions were by-products of the real effort, which was to make telephone service better. We are proud, of course, that they helped build and improve whole industries.

But we're prouder of the sound qualities in the telephone of today.

If you'd like to do business or engineering work you're really proud of, we'd like to talk to you.



Bell System

American Telephone and Telegraph Co.
and Associated Companies