
NEWS IN BRIEF

FIRE STRIKES A UNIVERSITY FAMILY

Fire completely destroyed the home last week of Buildings and Grounds employee Francis Jackson, his wife, and their six children—seven-year-old twin boys, eleven-year-old twin girls, and 13- and 14-year-old girls.

Mr. Jackson, a painting foreman of some 25 years, service to the University, has been hospitalized for several months suffering from a virus attack on his nervous system which left him paralyzed from the waist down. His wife quit her job to care for her husband when he was stricken.

The fire destroyed a just-completed remodeling job which took Mr. Jackson two years to finish. All the family's belongings were lost in the fire, including their Christmas presents and a wreath woven of money that neighbors had collected to help the Jacksons.

Contributions for the Jackson family are being accepted by Sam Cutrufello, Buildings and Grounds, Franklin Building Annex. Checks should be made out to Mr. and Mrs. Francis Jackson.

MORE ON AAAS MEETINGS

Special symposia-discussions from the coming meeting of the American Association for the Advancement of Science will be carried live each evening by 160 educational television stations throughout the country. WHY-TV (Channel 12) in Philadelphia will broadcast an hour of symposia highlights at 6 p.m. December 26 and at 8 each evening December 27 through 30.

The December 26 broadcast will feature a panel discussion which includes Professor Russell Ackoff, Professor Stanley Brody, and Herman Wrice, President of the Young Great Society, with NET producer David Prowitt as host.

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President Martin Meyerson will chair the AAAS Phi Beta Kappa Lecture, "Science Without Conscience," to be given at 8:30 p.m. Wednesday, December 29, in the Grand Ballroom of the Sheraton by Harvard Nutritionist Jean Mayer.

Provost Curtis Reitz will participate in a panel on "Women in Academia" at 9 a.m. Thursday, December 30.

THE SOUND OF ANCIENT MUSIC

The University Museum has initiated a Performing Arts Division as a first step in taking the study of cultures out of the galleries, according to Museum Director Froelich Rainey. "We hope that live performers will attract new people to our museum and that we can reach people outside with tours, films and tapes by our performing groups."

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Peace...
goodwill

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Almanac

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DENTAL SCHOOL DEAN: WALTER COHEN

The new Dean of the School of Dental Medicine will be Dr. D. Walter Cohen, a nationally known investigator in periodontal disease who joined the Pennsylvania faculty in 1951 as an assistant instructor.

At 45, Dr. Cohen is now Professor and Chairman of Periodontics and has been Associate Dean of the School for two years.

He was recommended by a 13-member search committee to succeed Dr. Lester W. Burket, who retires June 30, 1972, after 21 years as Dean. Dr. Burket will remain Professor of Oral Medicine.

His selection was announced jointly by President Meyerson, Provost Reitz and Acting Vice President Robert D. Dripps.

"Dr. Cohen is widely recognized as an outstanding teacher, scholar and clinician with a deep appreciation for the ties between dental health and other health fields," President Meyerson said. "He has demonstrated those qualities of leadership which are essential for the future development of dental medicine at Pennsylvania. He is an outstanding successor to Dean Burket, whose 21 years at the helm of the Dental School have been exceptionally productive ones."

Dr. Cohen took his dental degree at Pennsylvania in 1950 and spent a year as a research fellow in pathology and periodontics at Beth Israel Hospital in Boston before returning to the University. He became a full professor and chairman of his department in 1963.

In recent years, his research has focused on the relationship of periodontal disease to pregnancy and diabetes, an interdisciplinary study involving dentists and physicians. He has published extensively in his field and is co-authoring a series of 12 texts translated into four languages. He has lectured throughout the world.

He is affiliated with Philadelphia General Hospital, Einstein Medical Center, Children's Hospital and Children's Seashore House in this area. He is also consultant to the Naval Dental School at Bethesda, to Fort Dix Army Base and to Walter Reed Army Medical Center. In 1970 he was appointed to the

(Continued on Page 2)

Committee on Naval Research of the National Academy of Sciences/National Research Council. This year he was named to the Board of Governors of Hebrew University of Jerusalem.

Dr. Cohen is past president of the American Society of Periodontists, Chairman of the American Board of Periodontology, fellow of the American Academy of Oral Pathology, and a member of England's Royal Society of Health. He is a past president of the Philadelphia section of the International Association for Dental Research.

Following are the new Dean's first remarks to the faculty he will head.

THE FUTURE OF DENTAL EDUCATION

The faculty of the School of Dental Medicine is currently asking the question, "What will the practice of Dental Medicine be in twenty years and what should the educational program be to meet these needs?" Early in 1972, the faculty will develop a master plan with short- and long-range objectives.

I hope the faculty will be responsive and bold enough to break the constricting mold of traditional educational patterns and allow for more flexible development of the human potentialities of the student. During the past two years experimental procedures at the school have shown the possibilities for and value of multiple track curricula.

Conceivably, one track could train the practitioner who can be identified as the generalist who will deliver oral health care. Another track would train the student in a combined D.M.D.-Ph.D. program for a career which will utilize research and teaching experiences in making dental medicine a learned science. A track including D.M.D. certificate training in a clinical specialty could provide more master clinicians for the profession. The D.M.D. curriculum combined with the M.B.A. in health care administration could be another route available to capable and interested students. I look forward to greater cooperation with the University at large to take advantage of the many resources that can help dental school graduates make more significant contributions in oral health care.

I hope the faculty will endorse a comprehensive program in dental medicine in our teaching hospitals, and enable undergraduate dental students to be brought into the hospital environment early in their training. The fourth-year students will be spending more of their time in clinical facilities outside of the school. Participation in community clinics will enable the students to offer health care delivery to those living in the inner city. In order to improve delivery of oral health care to the population at large and to make the best use of manpower, dental students, hygiene students, dental assistants and laboratory technicians will be trained together at the undergraduate level to work in teams.

Preventive measures already have proven effective and they will be an important part of the curriculum and will be the basis for health services rendered to the community.

The dental school also hopes to establish an intramural practice facility which could become a "Mayo Clinic of Dentistry" for patients with difficult oral problems. Such a facility would provide a teaching model for students as well as providing data for third party payment groups. The development of standards for dental treatment could also occur in this facility.

The University of Pennsylvania School of Dental Medicine looks forward to assuming an international position of pre-eminence in dental education.

—D. Walter Cohen

Remarks by the Ombudsman at the President's Conference

It is now several months since first I was asked to become ombudsman. "Try it, you'll like it," they said, and now, a few alka-seltzers later, I feel ready to make a tentative progress report, and to indicate my response to a job that is at once discouraging and exhilarating.

It is discouraging because of the persistent recurrence of the Manichaeian fallacy, that simplistic assumption that those who inhabit the planet are either *good* guys or *bad* guys, and that there cannot possibly be merit in a point of view that differs from one's own. (How is one to mediate between an immovable object and an irresistible force without getting flattened in the process?)

The job is also discouraging in that we inherited some complex problems of long standing, problems in which evidence lies buried in the dark past, making any recommendation that will be satisfactory to the individuals involved very unlikely. And a less troublesome but nevertheless pervasive source of frustration is the fact that a few individuals are casual about answering—or acknowledging—letters, reports, and phone calls, thus complicating channels of communication that ought to be very simple. (My suggestion here, with a nod toward Dante, is that anyone who doesn't respond to a communication within five days should be required to sit in the steam room at Hutchinson Gym listening to tape recordings of old University Council meetings.)

On the other hand (an ombudsmanic locution if ever there was one) the job has many satisfactions. One is the chance to meet remarkable people whose lives would never intersect my own were I exclusively in Bennett Hall. And there is satisfaction in attempting to solve a problem before it gets out of hand, particularly since everyone has been willing to cooperate with our investigations, and with one exception, to accept (sometimes after persuasion) our recommendations. (We have not yet had to turn to *Almanac* or the *DP*, or to the President, as a means of applying pressure.) The office's end-of-the semester report card will include some F's (these are the cases we would now, with more experience, handle differently), and some Incompletes. It is the Passes, though, that permit some cautious, Libra-like optimism, and that make me think that there are probably compelling reasons for having such an office on our campus.

My assistant and I are often asked, "What sort of problems come to your office?" The question invariably evokes des-

Olive or Lemon Peel? *by Joel Conarro*

perate blank stares followed by some incoherent mumbling. This lapse into inarticulate stupefaction ensues partly because the cases do not fall into groups, and partly because those that are most interesting and most likely to be on our minds are precisely the ones that cannot be talked about publicly. We have handled (or are presently handling) 75 to 80 problems, and with very few exceptions no two are alike. Even though generalizations are impossible, however, I want to provide some rough numerical breakdowns and, being careful not to break any confidences, to follow these with a few discreet summaries. For purposes of convenience, I base this information on our first 65 cases. (Note: many of these cases involve more than one grievant.)

Undergraduate	18 cases, or 27% of the total cases.	
Graduate	22	33%
Total students	40	60%
A-1	3	5%
A-2	13	20%
A-3	9	15%
Total staff	25	40%
Total Men	43	66%
Total Women	22	34%

Here are a few representative grievances:

Copyright Questions:

Three very different problems have come to us. One involved an individual not connected with the University who intended to use, in a book, material taken from graduate research papers. He had not requested permission from the students.

Academic Matters:

Complaints about individual instructors, departments, and programs.

Housing:

A group of women law students appealed to our office because they did not have the same opportunity enjoyed by men (who could live in the law dormitory) to choose a nine-month rather than twelve-month contract.

Working Conditions:

A group of University employees working in the hospital came

to us because they were not receiving University benefits, i.e., they had to work on holidays and vacation days, had to work until 5 o'clock during the summer, etc.

Tuition:

Several undergraduates want information about paying full tuition even though taking only one or two courses. Presently being examined.

Plagiarism:

Complaints about term papers for sale in Girard Bank and Hamilton Court. Presently under investigation.

Professional Behavior:

Charges of unprofessional behavior brought by students against faculty members, by faculty members against graduate students, and by faculty members and students against departmental administrators.

Partial and Full-Affiliation:

Request for reinterpretation of "partially affiliated" and analysis of benefits that are (or should be) available to partially-affiliated members of the faculty.

Other individual cases involve such diverse matters as deposit funds nonforthcoming (all have subsequently come forth), policies on loans and scholarships, questions of office space, DP drop-off points, obligatory life insurance, fire-safety in Graduate Towers, racial discrimination, Student Health, and faculty promotions. In our May report Mrs. Koons and I will provide a full statistical breakdown on these and other matters. This summary is meant only as an earnest.

I end this informal report with the observation that the job has already affected my own life in important ways. Where formerly I spent eight or nine hours a week in the classroom talking about literature, I now spend eight or nine hours a day in various offices talking about God knows what. Where formerly I would go to a party and soon find myself in conversation about Pound, Poe, Proust, or Pinter, I now hear myself animatedly discussing Wages, Wharton, Women, and WEOUP. And asked whether I would prefer an olive or lemon peel in my martini, I am now apt to respond that there is, to be completely objective, a good deal to be said for each of these possibilities. And at that rate, to be completely objective, a man could die of thirst. Peace.

LIBRARIES

LIBRARIANS ASSEMBLY: A NEW CONSTITUENCY

The newly formed Librarians Assembly, chaired by Director of Libraries Richard De Gennaro, has elected Paul Gay of Biddle Law Library as Vice Chairman and Lois Kershner of Van Pelt as Secretary. Elected to its Executive Committee: Mrs. Jean Adelman, Museum; Mrs. Jane Bryan and Robert Stewart, Van Pelt; and Alan Morrison, Fine Arts.

The Assembly is made up of 85 professional librarians who meet monthly. It was formed September 22 to contribute to library service through communication and staff participation in library programs and activities of the University community. Its by-laws are currently being drafted.

DEATHS

ALMANAC has received notice of the deaths of the following members of the University family:

DR. SAMUEL BELLET (December 13 at 69), professor of clinical cardiology in the Medical School and internationally known heart specialist and researcher. He was governor of the American College of Cardiology for Pennsylvania and member of President's Commission on Heart Disease, Cancer and Stroke.

JAMES L. BUSH (September 14 at 54), security guard who served the University, in various capacities, for 34 years.

DR. I. CLYDE CORNOG (November 11 at 78), Emeritus Associate Professor of Physics since 1961. He began his career at the University in 1919, received his Ph.D. here in 1928 and was appointed Assistant Professor in 1943.

DR. JACQUES JENNY (November 20 at 54), Professor of Orthopedic Surgery in the School of Veterinary Medicine. He joined the University as an Instructor in Veterinary Surgery in 1948 and was named full professor in 1960. He had recently been named Veterinarian of the Year by the Pennsylvania Veterinary Medical Association, and was noted as a pioneer in the field of equine fractures.

JAMES A. JOHNSON (December 5 at 57), member of custodial staff at University Museum.

DR. JAMES H. JONES (September 28 at 84), an alumnus of the Medical School who worked on the discovery of Vitamin D. He began his professional affiliation here in 1924 as an instructor in physiological chemistry, directed Penn's chemical laboratory during World War II and became full professor in 1947. He was named Emeritus Professor in 1967.

MRS. ELIZABETH KELLY (November 8 at 66), house mother for Graduate Hospital's nurses residence since February, 1962.

DR. JOHN P. KOTIS (November 10 at 49), Assistant Chief of Counseling at the Marriage Council of Philadelphia. An alumnus of Wilkes College and the University, he was appointed Instructor in Family Study in Psychiatry in 1957 and Associate in Psychiatry in 1965.

DR. HELEN MCFARLAND WOODBRIDGE (November 30 at 78), a Medical School alumna and Assistant Professor of Medicine at the Evans Dental Institute before her retirement in 1958. Contributions in her memory may be sent to the Vermont Association for the Crippled Inc., 88 Park Street, Rutland, Vermont, 05701.

MARY ELLEN McMAHON, a secretary in the Wharton Graduate School office; September 25, in an automobile accident at the age of 18.

DR. HERBERT R. MOSKOW (November 17 at 54), an Instructor in Psychiatry in the School of Medicine since 1968.

DR. DOUGLAS P. MURPHY (December 12 at 78), Emeritus professor of Obstetrics and University alumnus who served as president of Penn Medical Alumni for 25 years.

GEORGE M. QUAY (September 13 at 59), photographic technician who developed and headed the photographic laboratories of the University Museum.

DR. DANIEL SILVERMAN (November 2 at 61), a professor of neurology at the Medical School who was acknowledged as an international authority on brain deaths. Dr. Silverman was named to the University faculty in 1946; at time of death, he was outgoing president of the American Electro Encephalographic Society.

APPOINTMENTS

WHARTON SCHOOL: ASSOCIATE DEAN

Professor John F. Lubin (Industry) has been named Associate Dean of the Wharton School for 1971-72, Acting Dean Richard C. Clelland has announced.

Professor E. Gordon Keith (Finance), who had held the post under former Dean Willis J. Winn, recently resigned to return to full-time teaching.

Professor Lubin has been on the Wharton Faculty since 1949. For four years (1964-68) he was also Director of Computing Activities for the University.

VET MEDICINE: ANIMAL BIOLOGY

Dr. Adelaide Delluva has been named Associate Chairman of the Department of Animal Biology in the School of Veterinary Medicine, effective December 1. Dr. Delluva received her Ph.D. in physiological chemistry (now called biochemistry) here in 1946 and began her teaching career here in 1942 as an assistant instructor.

ANNUAL GIVING

Kathryn L. Jurasek has joined the Annual Giving Staff with responsibilities for Annual Giving and Alumni Relations in the Graduate Schools of Education and Social Work as well as the Non-Alumni Parents Campaign.

DATA PROCESSING

William L. Branson has been named Manager, Systems and Programming, Office of Data Processing. He will handle administrative computing functions for the University, replacing Dominic Rocchi, who resigned. Branson is former Director, Systems Development and Technical Services at Food Fair Stores, Inc. He holds a B.S. in Business Administration from LaSalle College.

RARE BOOKS

Thomas G. Waldman has been appointed Rare Books Bibliographer on the Library staff. Mr. Waldman, who has a B.A. and M.A. from Columbia and Ph.D. from Oxford, has taught at the London School of Economics, Indiana University and most recently at the Medieval Institute at the University of Notre Dame.

FOR THE RECORD

Professor Humphrey Tonkin's new title will be Vice Provost for Undergraduate Studies, not Vice Provost for Undergraduate Affairs as published in this and other campus media.

Dr. H. Milton Rode, whose retirement as department chairman was announced in the September 21 issue, continues as Professor of Prosthetic Dentistry.

In October's American Statistician, the Acting Dean of the Wharton School addressed a plea to members of his discipline to "... take an increased interest in (universities) as an area of applied research." It might almost be read as a plea to universities to take a more professional interest in statistics and what they can do for the educational process.

On Statistical Studies of University Education by Richard Clelland

As a faculty member and a statistician, I am continually impressed by how little we understand the educational process as it goes on in universities. In simpler situations more is known, but even a first step such as learning the alphabet is not without its mysteries. This article, however, will not focus upon the very difficult problems of individual learning, but rather upon the much broader question of what statisticians can do to bring about a greater understanding of higher education and thus to improve its processes. I shall make quite specific suggestions as to types of research that are badly needed and that are largely ignored by professional statisticians even though the problems of design, control, measurement, and evaluation involved undoubtedly call for a high degree of statistical competence. If you like, this article constitutes a plea directed at statisticians—particularly those who are members of the faculties of universities—to take an increased interest in these organizations as an area of applied research. The matters discussed in this article are going to be studied intensively during the next ten years. If they are to be studied only by administrators, subject matter specialists, professors of education, politicians, and data processing experts, the results will probably be less than definitive.

A Chill Toward Cost-Effectiveness

Most faculty members are congenitally opposed to quantitative evaluation of university programs—particularly in a comparative sense and when applied to programs in which they participate. They feel that the value of these programs is (a) self evident and (b) impossible to express in terms of numbers or ranks. Perhaps they are right, perhaps not—in any case, the surest way to create a chilly atmosphere at a discussion of academic programs is to mention the term "cost-effectiveness." On the other hand, this is a time when financial pressures on universities are reaching very critical levels. If members of the academic community are unwilling to examine questions about the merits and demerits of present university activities, it has become all too clear that various outside agencies, particularly some which have in the past been sources of university funding, are quite ready to raise such points. We are all aware of situations in which slum revitalization programs, modern dance companies, and Asiatic wars have been given a higher priority than support of university programs by such organizations.

Are available funds being used by universities in a way which is expected to yield, surely not optimal, but at least reasonable benefits to individual students and to society? This question must be faced. Such apparent absurdities as building new football stadia while cutting scholarship funds or raising tuition because "everyone else is doing it" are neither unknown nor unnoticed.

We shall speak of universities as though they do not change over time. Of course they do, and occasionally the movement is rapid. But for the most part university programs change in quality, and in other important features, rather slowly. Those programs generally considered excellent in 1970 were also largely considered excellent in 1965. Incidentally, by the term "program" I mean any university activity that can be separated, educationally and budgetarily, from all other activities. Thus all university activity is thought of as composed of an exhaustive set of mutually exclusive elements called programs.

The practical difficulties involved in arriving at such a result are considerable, but not overwhelming. Typical programs would be "physics-undergraduate," "bookstore," "intercollegiate track," "ABC residence hall," etc. In the sequel, the discussion will center on academic programs, but the main points will be applicable to non-academic programs as well. In any case, whether a program is changing rapidly or not, one of its most important characteristics is the "quality" of its input.

And that brings us to our first main point, a question that has been studied many times and is still poorly understood: What students should be selected for each academic program? We do not even know how to identify students who will not be able to complete a program. If we had this sort of information, it would be quite easy to apply with undoubted beneficial results for all concerned.

We are all well aware of the hundreds or perhaps thousands of studies whose object is the prediction of a student's performance from various objective and subjective measures attributable to him at the time of matriculation—or, more likely, at the time of application.¹ These are of some value; certainly university admissions offices use them extensively, and no one would argue that such usual factors as secondary school performance, rating of secondary school, or SAT score are unrelated to performance in an undergraduate program. Furthermore, few would object to the use of such qualitative variables as recommendation of secondary school counselor or interviewer's rating. But the stark fact is that the best of these studies explain only about forty percent of the variance in the criterion being used. Typically a good study will explain some thirty percent of this variance, and many an enthusiastic master's degree candidate has had to settle for five or ten percent. Almost all these studies use linear regression, start with a large number of candidate predictor variables, and settle for some four to eight of these shown to be best in terms of one of the standard procedures based on significance tests.

Some have remarked that these studies would be greatly improved by the use of non-linear models, but this is probably not true. Such studies as have used simple non-linear functions have resulted in only a small improvement over a linear model. Rather, it seems likely that the source of much of the unexplained variance in the criterion derives from the omission of a rather obvious class of predictors from all these regression models. This leads to the first type of statistical study that needs to be carried out extensively in the field of university education.

The most common criterion in past studies has been freshman grade-point average. It has probably been used in some seventy to eighty percent of all regression studies of admissions. I shall shortly criticize its use, but for the time being let us assume that it is the dependent variable whose variance we are trying to explain. Is it not entirely reasonable that freshman grade-point average should depend not only upon the characteristics that a student possesses upon admission to a university, but also upon his experience once he arrives there? And surely it cannot be true that students with the same entering characteristics undergo the same first-year

¹For a summary of some of these studies, see Lavin, D. E., *The Prediction of Academic Performance*, Russell Sage Foundation, New York, 1965.

"What does it mean, 'to improve university operations'?"

experience. In short then let us hypothesize that x percent of the variance in freshman grade-point average is explainable in terms of variables relating to the freshman year. If this could be established and if admissions offices could be assured that their job was not to explain one hundred percent of the criterion variance, but only a much smaller percentage, think what a vast amount of light would thereby be shed.

The additional information needed for prediction of freshman GPA should be generated from a series of statistical studies of student activities and attitudes during the freshman year. These must be very detailed investigations of particular freshmen. One type would examine how the freshman spent his time. The usual time cards or pocket random alarms could be employed; direct observation would probably be impossible. A second type would systematize environmental factors characterizing a freshman's university experience such as section size, rank of instructor, areas of study, extra curricular activities, and commuting time. And a third would examine behavioral and adjustment factors by psychological testing and by interview. The results of these studies would be data on a set of freshman-year variables which would then be used to explain variance in the freshman grade-point average net of that associated with the several admission variables.

Beyond the Freshman Year

Of course, it is true that completion of a series of such studies would not yield data that could be used directly in the admission process. But the real question is much larger than admissions. The university is first interested in selecting the right candidates for its programs, but after a class is chosen, it must also be interested in increasing the value of the university experience *to that class* and through it to society. Variables in the university environment which control learning must be identified and dealt with. Let us now reconsider freshman grade-point average as a criterion variable.

Hardly anyone would say that freshman GPA is a reliable measure of performance throughout a program or afterwards. A more useful set of studies would aim at predicting average grade points for all four years or for the last two. This suggests strongly that the detailed studies we discussed as taking place during the freshman year should really cover the duration of the program. It is not hard to argue that variables affecting a student's experience, up to the time that any criterion is measured, are needed for a satisfactory statistical explanation of that variable.

But the criteria mentioned in the last paragraph are not very satisfactory either. Again, few would say that any measure based on university grades was a very reliable proxy either for "success" in the sense that an individual might see it or in terms of "contribution to society." Another type of study that I wish to suggest here involves a large-scale, long-term effort. It would follow groups of alumni from graduation through the productive part of their careers collecting data relevant to "success" in the second sense just mentioned. It would then construct measures of success² and endeavor to relate these both to pre-college data and to data describing the educational programs attended by the subject. Only when considerable work of this sort has been done can we begin

to come to grips with the problem of evaluating educational programs. Hopefully, retrospective studies would be possible to some extent, but these could not be definitive. We shall have to wait a long time before we reap the benefits of this type of investigation. But simply because these studies cannot help in the crisis of the next several years is no reason for those who feel the problem is important to fail to begin. Real evaluation of the effects of university programs must relate to criteria based on post-university performance.

In theory the goodness of a university program is stated by an average success measure of its graduates net of the effects of all experience prior to matriculation. In theory society would like to admit students to university programs each year in such a way as to maximize the resulting sum of increments in contribution to society taken over all students. We shall never be able to attain such an ideal. On the other hand, sensible approaches to the problem of relating inputs and outputs of universities will move in this direction. Perhaps it can be shown that, in some average sense, an individual's activities during the first ten years after graduation from a program can yield an approximate measure of his total contribution to society.

Candidates for admission to university academic programs would be very interested in comparing the "success" of graduates from these programs by better methods than are presently available. Catalog descriptions are always rosy, and subjective evaluation can be very misleading. Valid comparisons are really not possible with the data presently available. Organizations supporting higher education financially would also be more than a little interested in the results of these sorts of studies.

Both types of research mentioned so far involve difficult problems in the construction of adequate measures, large-scale data collection jobs, and an undetermined amount of multivariate analysis. Of course, the second type is much more difficult than the first. Statisticians, particularly university statisticians, should be making a concerted effort in this direction. Not only are the problems of explaining student performance, both in the long and short run, extremely important in themselves, but also our lack of understanding in these areas poses severe difficulties in most attempts to improve university operations—as will be discussed at the end of this article.

What does the somewhat nebulous phrase "to improve university operations" really mean? In the last analysis it refers to a relationship between input, output and cost of operation. Let the i th university academic program have as input n_{i1} students of average quality q_{i1} . Let its output be n_{i2} students of average quality, q_{i2} . Let the total cost of the program during the time period be c_i . Then a simple-minded measure of the efficiency with which the program is operated might be

$$(n_{i2} q_{i2} - n_{i1} q_{i1}) / c_i, \quad (1)$$

the total increment in quality produced by the program per dollar spent during the time period in question. Of course, the reader can easily write down more sophisticated measures of efficiency than this one, some of which would undoubtedly be superior to it in a real study. The point is that, whatever measure may be used, efficiency of operation can be increased in at least the following three ways: increasing n_{i2} , the number of graduates; increasing q_{i2} , the average quality of a graduate; or decreasing c_i , the cost of operating the program. Notice in particular that accepting more freshmen or raising their average quality does not necessarily improve the effi-

²See for example, Brown, D. G., "A Scheme for Measuring the Output of Higher Education," in *The Outputs of Higher Education*, WICHE, Boulder, Colorado, 1970. The WICHE (Western Interstate Commission for Higher Education) Project is currently making a comprehensive investigation of management information systems and data bases for institutions and agencies of higher education.

"... typically, they will not know the cost of a graduate student."

ciency measure and can easily reduce it. This bears out our intuitive feeling that a very fine student in a very bad program is wasting his time. Of course, all admissions offices try to obtain the matriculants whose academic qualifications are the highest despite the fact that many institutions might well be able to produce a much greater increment in students of more modest attainments. I shall not place much emphasis upon the reduction of academic attainment in matriculants as a way to increase program efficiency since the acceptance of this concept by admissions offices and university administrations will be something less than enthusiastic. I shall merely mention that this situation is not unrelated to underachievement, dropout, and low student morale, and then proceed to the next point.

Redefining Quality

I have thus far not defined the term "quality," and this omission was intentional. High-quality freshmen are usually considered to be those who have made good grades either in academic subjects at good high schools or on standardized achievement examinations. A somewhat more useful approach defines high-quality applicants as those lying at the top of whatever weighted-regression index the admissions office is currently employing. High-quality graduates are customarily defined to be either those who have acquired high academic grades in college or have otherwise distinguished themselves. This is a very different point of view from that suggested by this article—namely that high-quality graduates are those whose expected contribution to society is the greatest while high-quality matriculants are those who are expected to receive the greatest increment in expected contribution to society as a result of their university experience. But however quality is measured, the previous comments on efficiency are valid.

Since universities do have multiple goals, the efficiency measure (1) does require further discussion. Let us consider the development of new knowledge and the furnishing of community services as the two main university objectives beyond that of educating students. Suppose within the i th program we can break out the costs of these activities and obtain their quantity measures m_i and r_i as well as their average quality measures s_i and t_i respectively. Then the efficiency of the research and community service aspects of the i th program might be given by

$$m_i s_i / c_i' \text{ and } r_i t_i / c_i'', \quad (2)$$

where c_i' and c_i'' are respectively the costs of the research and community service activities in the i th program. We shall not discuss the problems involved in combining the three measures from (1) and (2) into a single program effectiveness measure nor those relevant to the further combination of overall program measures into a single university effectiveness measure. There are problems enough involved in obtaining the three stated measures for each program without becoming involved in a snowball effect. Let us instead address the problem of what sort of statistical studies are needed to point the way to improvement in university program efficiency, that is, to increase the numerators of (1) and (2) or to decrease their denominators.

Probably the most important contribution that statisticians can make to the problem of improved university operations is an intensely practical one. Universities generally have allowed a good deal of diffusion of their decision-making processes; certain schools or departments in the past have achieved a nearly autonomous status. And many decisions at all levels tend to be made on a "seat of the pants" basis

rather than by some more rational procedure. As a matter of fact, there is considerable irony to be found in the way in which universities, while seeking truth and promulgating logical thinking, have managed their own affairs. At present the central administrations of most universities badly need the help of statisticians in response to such questions as: "What data do we need to collect and maintain in order to run this university properly?" "How shall we go about collecting it?" "How shall we store it, and in what form?" "How long shall we keep it?" "Who shall have access to it?" In short, university administrators need to have a much increased factual input to their decision-making activities as they attempt, in response to financial pressures, to attain greater control over their institutions' suboptimizing. Statisticians should study the question of supplying them with the most appropriate data base.

Universities routinely do a good job of data collection when information is demanded by a powerful outside agency. They prepare reliable data on faculty salaries at the request of the American Association of University Professors. They produce careful surveys of minority employment for the federal government. But typically they will not know such important statistics as the average cost of educating a graduate student in History during the academic year 1970-71. Some universities' administrations would have great difficulty even in determining the number of graduate students in History enrolled during 1970-71. The figure would develop an amazing amount of variability when such modifiers as "non-paying," "part-time," and "undergraduate taking advanced work" entered the discussion. The fact that university data bases are often quite poor makes improvement of university operations of all sorts much more difficult than it needs to be.

Politics and Intuition

Without going into detail, one point is very clear. Sensible decision making at universities requires that the totality of activities carried out should be divided into programs—as previously discussed. Data should be collected by program and stored by program. So many important decisions that the central administration must make involve allocation of resources among programs that no other approach is acceptable. Unless data are handled in this way, university decision making will continue to contain a much larger element of politics and intuition than most of us would think desirable. Much data should be kept centrally, one can hypothesize, in an automated facility, accessible in full to top administrators, and accessible in part to functions such as comptroller, registrar, and dean. Formats used by these several functions must be completely compatible. Statisticians would work closely with both administrators and data-processing experts in the course of these studies.

The next type of research on university activity that recommends itself to statisticians is one in which considerable work³ has already been done, although this seems in general not to be of a definitive character. I am speaking of comparative studies of teaching method. Much past work has centered in the use of audio and visual aids as a replacement for all or part of the usual classroom lecturer. However, at the present time, although on the one hand we hear that "class size 15 to 20 is optimal" and on the other hand that "closed-circuit TV in groups of 200 is the coming thing," no

³See, for example, Murphy, J. and Gross, R., *Learning by Television*, The Fund for the Advancement of Education, New York, New York, 1966.

one really knows very much about the results of lectures, seminars, television, reading courses, monitor systems, etc. as an alternative means of achieving whatever it is that a course is supposed to achieve. In this country the university is largely wedded to the lecture system. In certain other countries, Great Britain for example, this is not the case. What would happen if we were to move to a system that emphasized preparation for examinations with responsibility for this preparation placed upon the student? We badly need a large number of carefully-controlled experiments on teaching techniques on the university level. Since we apparently can no longer afford to have Mark Hopkins on the other end of the log, what shall replace him? A book? A library? Six graduate-student instructors? A roll of tape? A consortium of experts? A television set? Statisticians should show more interest in this problem—particularly those of us who teach. An interesting hypothesis is that teaching techniques which place greater responsibility for learning on the student than does the standard lecture technique will increase academic program efficiency both in the sense of improving quality at graduation and in the sense of reducing program costs. Under these teaching methods, however, would the numbers of graduates diminish so as to cancel the hypothesized gains in efficiency? These are questions that must be studied even if we are to do nothing more than defend present procedures in the face of external questioning. They need careful attention from statisticians.

What Happens to the Student?

Related unanswered questions concern the interaction of the teaching function with the research and community service functions of universities. I am not speaking of the undoubted facts that some excellent research scientists are extremely bad teachers, that some fine teachers are not equipped to carry out research, or that a man who combines excellence in both respects is likely to be a splendid contributor to his university. Rather, I raise the question of how well we understand the optimal use of research activity as a milieu for all university education. What happens to the student when we remove him from the classroom, the lecture, and the weekly assignment, confront him with one or more real research experiences, and build his curriculum around these? What proportion of students, graduate and undergraduate can profit from this sort of education? Can we identify them a priori with some degree of consistency? Must such education be very costly? Again, the answers to these questions are not known.

How about the third function, community service, as an alternative organizing principle for curricula? The present generation of students, or at least a large subset of the present generation, has strong interests in this direction. At most universities student organizations have developed, formally or informally, which provide opportunities for community involvement through political activity, tutoring projects in neighboring elementary and secondary schools, pollution monitoring, aid to minority businesses, clean-up campaigns for park areas, etc. Cannot real experiences of these sorts also provide more motivation for learning than does the present formal system? No one really knows.

Much has been made of the multiple objectives of universities.⁴ Teaching, research, and community service are most often presented as competing objectives, each struggling to increase its particular portion of the university's "scarce resources." Careful experimentation is needed to test the notion that the competition may in large degree be unneces-

sary if the teaching and learning methods presently in vogue can be modified.

I shall mention only one other type of study on teaching method that is currently much needed. Many universities, in response to social pressures, are presently modifying their admissions standards so as to bring into their entering classes large numbers of students from minority groups who are, in terms of traditional criteria, less well prepared than the rest of the student body. This development may be subsumed under the general community service goal of a university. One cannot quarrel with the desirability of this trend, yet a word of warning is necessary. To accept these students as freshmen and then to flunk them out after a few semesters is probably more damaging to them and to society than simply not admitting them in the first place. When universities admit such students, they must be prepared to make an additional commitment of resources in order to give them a chance of completing the program that is at least somewhat comparable with that available to students admitted under the standard criteria. At the present time, no one can make realistic estimates of the magnitude of this additional commitment, nor can any one speak authoritatively on the way in which it should be used. No one knows whether additional tutoring by faculty has a greater effect than increased contact with non-minority students or reduced course loads. Here then is a whole subclass of problems in educational method which has never been treated experimentally. Statisticians take notice!

In summary, it is clear that universities are extremely complex organizations. During the next decade, largely because of external financial pressures, American universities must reexamine their activities and either develop new approaches to higher education or prepare to defend the old ones. Many of these studies will call for considerable statistical expertise. I have mentioned four general types in which statisticians should become heavily involved, namely:

A. Studies of the student population aimed at clarifying the meaning of performance indicators available at the time of application for admission.

B. Studies of the success of university graduates aimed at defining and measuring this quantity and the contribution of the university to it.

C. Studies of a university's data base aimed at advising administrators as to its composition and organization.

D. Studies that compare teaching methods in an attempt to improve the efficiency with which university programs are operated.

I am sure that the readers of this article will have no difficulty in identifying other interesting statistical problems in the university environment.

In all of the studies of teaching method and of other good factors where the aim is to increase the efficiency of university operations, the dependent variable will measure in some sense the value of the university's output. It is in this sense that the second suggested type of study assumes additional importance. Until we can deal with the concept of contribution to society or replace it by some other acceptable success measure, all comparative studies of teaching method or of budgetary allocation will arrive at their conclusions on the basis of some ad hoc, and thus unsatisfying, criterion. Perhaps then studies of type B, those directed at the "value added" by universities to their student output, are the most fundamental of the several types suggested here. But, at a time when society itself is faced with very serious problems in the allocation of available funds, universities must take a hard look at themselves in terms of all four types of study. And statisticians should be prominent in this research.

⁴As an illustration, see Orgel, S. and Zwending S., "On Judging Faculty" in Morison, R. S., *The Contemporary University*, Houghton Mifflin, Boston, 1966.



Having-your-Vance-Hall-and-eating-it-too proved feasible for Wharton Gold Medalists and Vice Dean Samuel Sapienza. The real Hall is still under construction, but a confectioner's model was dessert at the 22nd annual Wharton Gold Medal Dinner, which highlighted the Graduate Division's 50th Anniversary.*

*L. to R.: John A. Mayer, WG '33, Chairman of Mellon National Bank & Trust; Henry J. Tasca, WG '34, U.S. Ambassador to Greece; John Dearden, WG '46, Herman C. Krannert Professor at Harvard Graduate School of Business; Charles S. Wolf, WG '43, President of York Container; Robert G. Dunlop, Chairman of Sun Oil; Lawrence A. Tisch, WG '43, Chairman of Loew's Theatres; Vice Dean Sapienza, Director of Wharton Graduate.

WHARTON FORECAST: 1972 ECONOMIC PROGRESS DEPENDS ON ATTITUDES IN PHASE II

This is the time of year when economic forecasts are focusing on the calendar year ahead as well as on the quarterly patterns for the near and intermediate future. As we approach 1972, the Wharton Mark III Model is projecting healthy economic expansion for the year ahead. We fully recognize that economic progress in 1972 depends upon the success of Phase II of NEP, on public attitudes towards the new guidelines, and on international cooperation.

In spite of the mood of uncertainty prevalent throughout the land about the working of Phase II, the Wharton Model is giving a clear and persistent signal, one that was already evident in our first forecast with NEP on August 17, just two days after the President's announcement. We project that in 1972, nominal GNP will expand by approximately \$100 billion, that real output will grow by nearly 6%, that the inflation rate will slow to an amount under 4%, and that both unemployment and net exports will improve somewhat. This is not yet a picture of an exuberant economy, nor do our projections reach Administration targets of approximately 4.5% unemployment, 2% inflation, and substantially positive net exports. This Forecast does, however, represent good growth and good progress in the fight against inflation.

<u>Forecast</u>	<u>1971</u>	<u>1972</u>
Gross National Product	\$1051.7	\$1149.6
% Change in GNP	8.0%	9.3%
% Change in GNP deflator	4.7%	3.6%
% Change in real (constant dollar) GNP	3.1%	5.5%

Specific improvements in the economy will be apparent during the next year. We anticipate that the housing market will show continued strength and will remain near its recent high levels. With the re-establishment of investment tax credit and liberalized depreciation guidelines, we see a pick-up in business fixed investment. Inventory accumulation, which has been held back by the need to use up inventories of steel accumulated in expectation of a steel strike, will lend substantial force to economic expansion next year. With good economic growth in 1972, we project some further declines in interest rates, and a modest recovery in our balance of

payments. These developments result in a strong profit expansion during 1972 with projected increases of 21% in profits before tax and 27% in profits after taxes.

With respect to our balance of payments position, new calculations of import and export price elasticities for refined product groupings show that the coefficients used in the Model may underestimate the full degree of sensitivity of the net export balance to new exchange values and the import surcharge. If we assume that the average elasticities for imports and exports as a whole are as large as unity in a buildup over a period of four quarters, then the net trade balance can swing by as much as \$8.0 billion in favor of the United States. This estimate is based on an alternative projection but we do not consider this outcome as very likely. This is an outside estimate but would have a favorable effect both on the level of domestic performance and in the overall success of the international aspects of NEP.

Although many sectors of the economy, as we have stated above, will show significant improvement in the coming year, we project that consumer spending will not pick up as much as is hoped due to uncertainty concerning the new policies and reflected by the consistently high projections of the personal savings rate.

Despite sluggish consumer response, however, the Model projection indicates that recovery should continue beyond 1972, and full employment could be reached by 1973. This expansion should bring about a small increase in inflation, but certainly not as large as that accompanying the Vietnam years. The winding down of the War together with the present slack in the economy provide an environment in which expansion can occur without pressing heavily against capacity ceilings and re-igniting strong inflation.

The policy forces which account for economic improvement include fiscal and monetary measures which were taken during the past year and which are now under consideration by Congress. Two of these measures include the personal tax reduction and the investment tax credit proposal, both incorporated in the President's NEP package. These, along with proposed expansion of social security benefits will lend sub-

A-3/A-4 PERSONNEL BENEFITS

Rulings from counsel since the federal wage-price freeze entered Phase II have made it possible to implement the A-3 and A-4 personnel benefits package announced in October.

Details of the changes in benefits were supplied this week by Gerald L. Robinson, Executive Director of Personnel and Relations, by Dr. Fred C. Ford, Director of Personnel. Additional questions will be answered on request, either individually or through ALMANAC.

Vacation Allowance. Employees with two years of service will now receive three weeks of vacation. With three years of service, the annual vacation allowance has now been raised to four weeks. For employees in their first year at the University, vacation will continue to accrue at the rate of one day per month of service to a maximum allowance of 10 working days.

Sick Leave. The sick leave accrual for employees in their first year of service will now be one day a month instead of the prior rate of one-half a day a month. Employees with less than one year of completed service will find the sick leave allowance on their 1972 Absence Record cards updated to include these additional days.

Beginning January 1, 1972, all employees will be eligible to accumulate unused sick leave during the ensuing three-year period. At the end of 1972 any sick leave not taken will be added to the 1973 allowance, and the process repeated in 1974 to complete the initial three-year accumulation.

Personal Leave Days. Each regular employee shall be eligible to three personal leave days during the calendar year unless a collective bargaining agreement designates a different time schedule. New employees may take not more than one day during the first six months of employment. In scheduling personal leave days, the employee will give a notice of at least three working days if possible. Personal leave days will not be accrued beyond the calendar year.

Workmen's Compensation. Full compensation during the first seven days of absence because of an injury sustained in the course of employment will be provided in the case of any individual who does not have sufficient accrued sick leave to cover this initial period.

Vesting of Retirement Allowance Plan. Prior to the recent improvement in the benefits package, an employee who left the University with 20 years of service would have the accumulated retirement allowance set aside for payment on attaining age 62. For any employee leaving after December 1, 1972, however, the service period for vesting has been reduced to fifteen years.

Bridging. Any regular employee leaving the University with two years' service and returning within 90 days has his employment record treated for benefits eligibility as though no break in service had taken place. With an absence of more than 90 days before returning to University service, it has been the practice to "bridge" this prior service after two years of subsequent employment. Under the new program the waiting period for this bridging of employment has been reduced from two years to one year.

stantial impetus to the economy during the coming year. Monetary policy presently appears to be moderately restrictive, but we have seen a sizeable expansion of the money supply during the past year which provides a basis for the finance of housing and investment.

One cannot yet be sure of the ultimate impact of the price and wage controls which make up Phases I and II of the President's program, but if the Pay Board and Price Commission have moderate success in achieving their goals, we can foresee growth of prices and wages clustering around 4% and 6%, respectively during 1972—a substantial improvement over the record of the past year and a stimulus to real demand and confidence.

It is significant that our new forecasts present this expansionary picture of the U.S. economy in the face of continued military de-escalation. At Wharton we have assumed that the armed forces will be reduced by another 200,000 by mid-1972 and continue falling in 1973. Military spending is assumed to be practically constant in nominal amounts for the horizon of this forecast, representing a reduction in real military spending. The expansionary civilian measures that have already been set in motion should be enough to compensate for de-escalation. As far as a peace settlement in Vietnam is concerned, the worst of the domestic economic effects have probably already been felt.

It is useful to review some of the highlights of year-ago forecasts for 1971 and compare them with our present estimate for this year.

Item	Current Estimate	Forecast	Forecast
		11/19/70 (Old Model)	1/6/71 (New Model)
GNP current dollars	1052	1046	1050
GNP 1958 dollars	742	750	747
Deflator, 1958-100	141.6	139.0	140.6
Non residential investment	108	106	104
Residential investment	40.5	38.5	37
Inventory investment	3	5	2.75
Net exports	1.5	4	6.5
Unemployment rate	5.9	5.2	6.0
Profits	83	90	87

At the end of last year we were phasing out the old Wharton Model, constructed in 1966 and revised in 1968. Its forecasts were not bad—a bit low in current price output and high in constant price output. It was low on unemployment and high on profits. Directions of movement were all right but magnitudes were not.

The new model—Mark III—was a considerable improvement. This model was used in an experimental basis at the turn of the year and has been in service since that time. All Wharton Quarterly forecasting is done now with Mark III. All components of a 200 equation forecasting system are not closer, as can be seen from the above table, but the main magnitudes are. Mark III forecasts are quite close for GNP (nominal and real), price lead, unemployment and profit.

The forecasted values from the Wharton Quarterly Model for 1970 were also close to the mark. The November 25, 1969 forecast run predicted that in 1970 GNP would increase by 4.8%, prices would increase by 4.7%, and real GNP would show virtually no growth (+0.1%). The corresponding increases in actual data for 1970 are 4.8, 5.5, and -0.6% respectively.

—Lawrence R. Klein, George R. Green, F. Gerard Adams

COMPUTERS IN THE CLASSROOM FOR CHEMICAL ENGINEERING DESIGN

The use of computers as a classroom tool in chemical engineering education continues to expand at the University.

The Esso Education Foundation has awarded a \$40,000 annual grant, to be matched by University funds, to Drs. Warren D. Seider, Ronald L. Klaus, and Melvin C. Molstad to continue their work in creating a calculating system for computer simulation and design of industrial chemical manufacturing processes.

A key aspect of the current project is the development of new interactive man-machine programs to allow students to think about the consequences of their decisions as simulated by the computer.

"Presently most people cannot justify the extra cost associated with typewriter terminals and telephone communications that enable people to make decisions at consoles," says Dr. Seider, associate professor of chemical and electrical engineering. "We believe our project will demonstrate what students can really do with a time-sharing program."

When completed, said Dr. Klaus the system will allow a student to manipulate a computer as if it were actually a big chemical plant. He or she will be able to study the controls and the start-up of transient processes and be able to make on-the-spot judgments.

"One favorable aspect of computer simulation," said Dr. Seider, "is that when a student isn't sure about which valve to open, it won't blow up if he makes a mistake."

Uniform documentation of the system's programs for use by other institutions is another key feature of the Pennsylvania project. Since the University is a member of the CACHE (Computer Aids for Chemical Engineering Education) Committee, established by the Commission on Education of the National Academy of Engineering specifically to speed-up classroom computer use, all of its programs are being adjusted to meet CACHE standards. User's guides containing sample problems are being assembled for distribution to interested educators and businessmen.

Less Drudgery

The scope and efficiency of the system's program library, which reduces the drudgery of equation solving, will also be improved, and the addition of time sharing inquiry-response features to most programs will reduce computation costs in course work.

Over the past three years, efforts have been devoted to the design and implementation of computing programs for steady-state and dynamic material and energy balancing, for process design and optimization, and for physical and thermodynamic property estimation. The first step in any chemical process design—the calculation of material flows and stream composition—is extremely laborious without the help of an electronic computer, and most calculations required for energy balancing are far too extensive to do without one, especially in processes involving recycling. To alleviate this problem, executive programs capable of assembling and solving the hundreds of equations requisite for chemical process design are being developed in a manner that will allow very inexperienced persons to write error-free programs.

Perhaps the most important underlying factor in the Pennsylvania calculating system is its ability to provide rapid property estimations during these complex calculations. Its physical property information system provides estimates of densities, viscosities, vapor pressures and other properties at various temperatures and pressure conditions. Chemical struc-

tures, as such, are not currently stored, but are represented by a code. Facilities for storing structural representations are planned, however. A related system is being designed to store and retrieve information about chemical process equipment; information, for example, which allows students to take into account pressure drops and heat transfer rates.

Other notable features of the system include a translator which automatically converts FORTRAN programs into calculating system subroutines, eliminating the need for the student to worry about the internal details of the executive program; a program that enables the student to study economically competitive alternatives for equipment purchase, installation and operation, including labor costs; a program to simulate the changes in flows, compositions, temperatures and pressures that occur during plant start-up, including the propagation of upsets and disturbances throughout the plant; and finally, a cathode ray tube display that permits data plots and chemical process flow sheet alterations using a light pen.

Most of the University's programs are written in FORTRAN for distribution to professors at colleges and universities using different computers. Pennsylvania's programs are written to execute in the batch or time sharing mode on the IBM 360/75 and the RCA Spectra 70/46.

The Chemical Engineering Calculating System is administered jointly by the School of Chemical Engineering and the Information Systems Laboratory of the Moore School of Engineering under the direction of Morris Rubinoff.

—Don Fey

OF RECORD



*Guidelines for University parking
as established by the Traffic Court
of the University Judicial System
on November 18, 1971*

The Traffic Court of the University Judicial System has established a set of guidelines for campus parking in order to better inform the University community of the regulations controlling the towing policy of the University of Pennsylvania.

Any automobile will be considered illegally parked and therefore liable to towing if it is:

1. in any University parking lot or garage without a legitimate sticker.
2. in any fire or trash lane as indicated by posted signs.
3. blocking any reasonably continuous passageway along a sidewalk or walkway (such as the walkway between Harnwell House and the ZBT fraternity house at 39th Street, Locust Walk at 36th, 37th, and 39th Streets).
4. in any area that is clearly marked as no parking zone (such as 36th Street).

Students and University employees are urged to use their discretion at all times and to look for indicators such as chains (whether up or down) or road markings in the absence of signs.

—Clerk of the Judicial Court

BULLETINS

HOLIDAY SCHEDULE FOR LIBRARIES

	Main Circulation	Reserve
Wednesday, December 22	8:45 a.m.-5 p.m.	8:45 a.m.-5 p.m.
Thursday, December 23	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Friday, December 24	Closed	Closed
Saturday, December 25 (Christmas)	Closed	Closed
Sunday, December 26	Closed	Closed
Monday-Thursday, December 27-30	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Friday, December 31	Closed	Closed
Saturday, January 1	Closed	Closed
Sunday, January 2	Closed	Closed
Monday-Friday, January 3-7	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Saturday, January 8	Closed	Closed
Sunday, January 9	Closed	Closed
Monday-Friday, January 10-14	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Saturday, January 15	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Sunday, January 16	Closed	Closed
Monday, Tuesday, January 17, 18	9:00 a.m.-5 p.m.	9:00 a.m.-5 p.m.
Wednesday, January 19	RESUME REGULAR HOURS	

HEARTY APPETITES (FACULTY AND STAFF)

Holiday Specials in the Class of 1920 Dining Commons

38th Street between Spruce and Walnut

Monday, January 3, through Tuesday, January 18

Breakfast (8 a.m. to 10 a.m.).....All you can eat.....\$1.10

Lunch (11:30 a.m. to 1:30 p.m.)....All you can eat.....\$1.50

HOLIDAY MAIL SERVICE

The University Mail Service will provide all of its regular mail operations during the Christmas vacation period which is stated in the current Personnel Department Bulletin. However, service will be on a reduced basis.

The Mail Service will have personnel on duty during the above stated period from 8:00 A.M. until about 1:00 P.M. or as late as necessary to dispatch all mail which is received. At least one delivery and collection will be made at any delivery point which is open. Special collections of large mailings will be made if possible upon notice by telephone.

The U.S. Post Office will deliver mail to all University buildings that will be open to receive it. Mail that cannot be delivered will be held by the U.S. Post Office or the Mail Service during the vacation period and will then be delivered on the first mail delivery after regular service is resumed.

In order that the U.S. Post Office and the University Mail Service may coordinate and plan their mail deliveries and services for the Christmas vacation period, it is requested that the Administrator or Department who controls the receipt and delivery of mail in each building or separate delivery point complete the following questionnaire and return it as promptly as possible to the Mail Service, Franklin Building Annex, 125 South 36th St.

Please Detach and Return to Mail Service, Franklin Building Annex

From
School, Department or Organization

Place check marks in the appropriate blanks below

	FRI. Dec. 24	MON. Dec. 27	TUES. Dec. 28	WED. Dec. 29	THURS. Dec. 30	FRI. Dec. 31
1. Deliver U.S. Mail						
2. Deliver Campus Mail	Holiday					Holiday
	No Del.					No Del.
3. No Mail Deliveries						

(Signed)

DINING SERVICE: CHRISTMAS RECESS SCHEDULE

All dining facilities closed December 23 thru January 2.

Houston Hall: Main Dining Room will relocate to Stouffer's Dining Commons. Balcony Dining Room closes permanently on December 23. Soda Grille will relocate to Houston Hall Main Dining Room, opening Wednesday morning January 19.

Hill Hall: Dining Room opens Monday, January 3 for lunch only (11:30 a.m. to 2:00 p.m.); resumes regular service January 19. Soda Grille has limited hours January 3 thru January 18 (8:00 a.m. to 2:00 p.m.); resumes regular service January 19.

1920 Commons: opens for breakfast and lunch January 3 thru January 18; resumes regular service Wednesday, January 19.

1920 Snack Bar: resumes regular service Wednesday morning, January 19.

Stouffer Dining Commons: opens Monday morning, January 17.

Law School: resumes regular service Monday morning, January 3.

Quad Grille: is closed through January 17; resumes regular service Tuesday evening, January 18.

NEWS IN BRIEF CONTINUED FROM PAGE 1

William Smith, Assistant Conductor of the Philadelphia Orchestra, is director of the new venture.

Agi Jambor, as honorary curator of the Museum's musical instrument collection, will oversee the rebuilding of 3,000 ancient instruments in the Museum's collection. She will also teach students to play them. Ethnographic dancing will be taught by Nadia Chilkovsky, director of the Philadelphia Dance Academy and the Performing Arts School of Philadelphia.

In the near future, the University Museum hopes to establish dance and music workshops in its building at 33rd and Spruce Streets. The public will be invited to observe students learning the music and dance of other cultures. Plans also call for performances throughout the Commonwealth.

RECREATION: AN UPWARD TREND

Comparing the first three months of this academic year with last, Recreation Director Robert H. McCollum found campus recreational use of gyms and playing fields had increased. The numbers represent student, faculty and staff use of facilities.

	Fall 1970	Fall 1971
Elective Classes	762	966
Children's Classes	60	55
Club Sports		
Number Serviced	23	28
Sailing Club Candidates	50	100
Women's Athletics	143	139
Performing Groups		
Modern Dance	16	36
Penguinettes	45	50
WAA Coed Volleyball	35	200
Touch Football—Intramural		
Teams Participating	106	123
Total Games Played	320	354
Total Participation	1272	1410
Discs/ID Cards Issued	7800	8636

ALMANAC: 515 Franklin Building, Ext. 5274

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