

Faculty of Arts and Sciences
University of Pennsylvania
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FAS

reports

RENEWING SCHOLARSHIP AND BUILDING TIES



In the past year, 175 men and women from 65 colleges and universities in the Delaware Valley have been coming to Pennsylvania to engage in the work of scholars. Each of them is attending one of the six seminar series that comprise the Lilly-Pennsylvania Program.

The program grew out of the mutual interests of the University and the Lilly Endowment, Inc. The University wanted to further its role as a regional resource. And the Lilly Endowment was interested in supporting programs to help faculty members stay intellectually vital at a time when faculties are getting smaller, and fewer people are moving to new positions and campuses.

Pennsylvania, along with Indiana University, Stanford, Yale, Chicago and Duke, was asked for ideas to bring regional faculty in a number of disciplines together for a two-year collaborative program. The Faculty of Arts and Sciences responded with a proposal for a series of seminar programs appealing to different disciplines and using different formats. They are Cognitive Sciences; Literature and the Visual Arts; Mathematical Modeling; Medieval Studies; and Technology, Medicine, Science and Society.

Explaining the concept behind the program, Peter Conn, its Director, said, "We don't turn to the Lilly Fellows as teachers, though they are and so are we, but as scholars."

All of the Lilly-Pennsylvania programs include a presentation by an outstanding authority on the topic and foster discussion among the participants—whether the program is taking place over a long weekend or every other week for a semester. The dialogue among colleagues has been encouraged not only during formal sessions but also through such informal opportunities as dinner. These informal moments have been a key to the success of the Lilly Program. In addition, Penn's research facilities, such as the library, laboratories and computers, have been made available to the Lilly Fellows. Thomas Waldman, Associate Director, is in charge of all the arrangements.

Cover Photo

The Armada portrait of Elizabeth by George Gower marks the English victory over the Spanish fleet in 1588. The breadth of her royal authority is indicated through her size and stature, the regal crown, and the globe; the destruction of the Armada is described in the images in the background. Like a Shakespearean drama it brings together all the important elements necessary to tell the story in one painting without regard for unity of time, place, or action, thus illustrating a key point made by Professor Roland M. Frye in his lecture described on page 3.

Overseeing the program are the dozen members of the Lilly-Pennsylvania Advisory Committee. These men and women include the organizers of the seminars, the University's Provost, and a number of deans and faculty members from some of the schools that are participating in the program.

The Lilly Fellows are chosen from those who apply according to how well their interests fit together with the focus of the seminar. Many of the Fellows come from small colleges where they may be the only person in their field. A great many of these people have heavy teaching loads with little time for research.

In the past faculty members in smaller, more physically isolated schools were continually rejuvenated as people moved to these institutions and exposed each other to new ideas in their fields. However, there is considerably less coming and going on today's campus. And fewer funds are available for conferences and scholarly meetings.

"The Lilly program really is putting local people, especially from small schools, in contact with an international scholarly community," said Edward M. Peters, Henry C. Lea Associate Professor of Medieval History, who planned the Medieval Studies program.

Another important benefit is that people in the area are getting to know each other. There are no regional associations for scholars of these interdisciplinary topics. Thus the Lilly-Pennsylvania Program has been instrumental in bringing together these groups with similar interests.

"The people know each other. They're getting together. They're not simply coming into a room, listening to a paper, sitting next to people they never saw before, and then leaving," asserted Peter Conn. "The Medievalists, for example, are spending a whole year together."

The Pennsylvania faculty in the program have a chance to meet people and hear outstanding speakers, too. They also have an opportunity to test their ideas on a new group of colleagues. And, as in the case of the program in Technology, Medicine, Science, and Society, it has led to new ways of approaching their field.

"It makes people in the vicinity realize that Penn is not inaccessible, that it is here, that they can get to it, that the people here are worth talking to," concluded Professor Peters.

PERSPECTIVES FROM ART AND DRAMA

The Lilly-Pennsylvania Program is offering seminars in the following areas:

Cognitive Sciences deals with artificial intelligence, language acquisition, and natural language processing. Lilly Fellows can join two regular University courses: Introduction to Artificial Intelligence taught by Professor Aravind Joshi and a seminar in Natural Language Processing taught by Professors Joshi and Bonnie Webber, both in the Department of Computer and Information Science. During the summer of 1980, Lila Gleitman, William T. Carter Professor of Education and Professor of Psychology, offered a one-week seminar in The Development of Spoken and Written Language in the Child. In 1981, Professors Timothy Finin, Joshi, and Webber of the Department of Computer and Information Science will offer a two-week program on recent developments in the construction of "intelligent" computer systems.

Literature and the Visual Arts consists of three three-day seminars, each on a different topic. The American Landscape was the subject of a program developed by Professor Hennig Cohen of the English Department in the fall of 1979. Professor Roland M. Frye organized a three-day colloquium on the English Renaissance in May 1980 (see the illustrations on page 4). Mark Miller, assistant professor of English, has planned a third workshop for April 9-11, 1981 on Film and Literature, which will include Diane Johnson, novelist and author of the screenplay for Stanley Kubrick's *The Shining*.

Mathematical Modeling includes two seminar series, one centered around modeling problems in the biological sciences and the other in the social sciences. Both were developed by George Karreman, Professor of Physiology. For more information, see page 7.

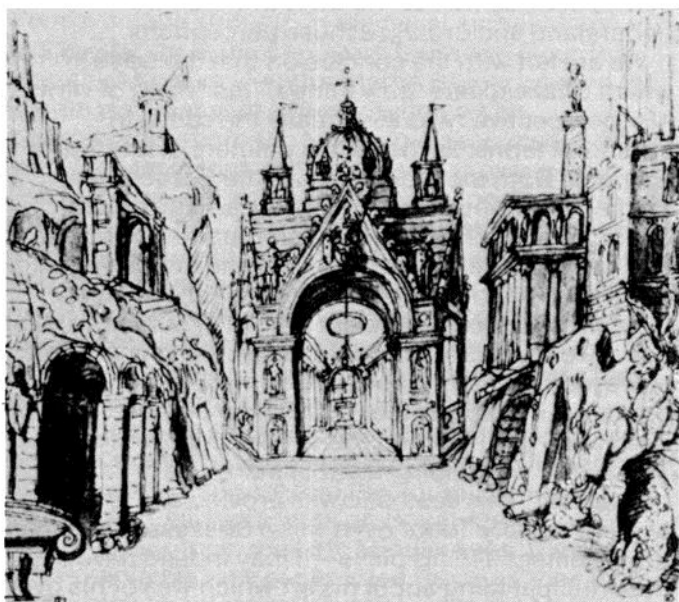
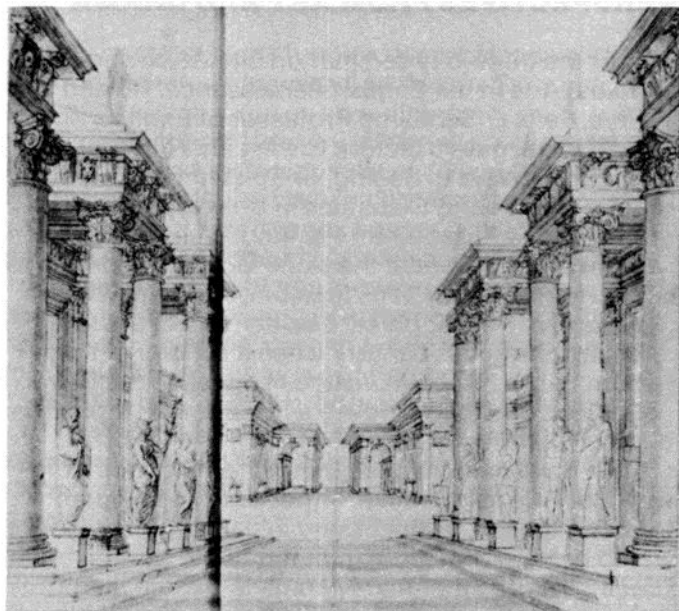
Medieval Studies, which is described in greater detail on page 6, was organized by Edward M. Peters, Henry C. Lea Associate Professor of Medieval History, around the themes of Town and Country (1979-80) and Literacy and Society (1980-81).

Technology, Medicine, Science and Society, a two-week seminar taught by Professors Mark Adams, Thomas Hughes, and Rosemary Stevens of the Department of History and Sociology of Science, linked the history of medicine, technology, and science through themes that cross the disciplines. For more information see page 4.

At the three-day seminar on Literature and the Visual Arts in the English Renaissance, Roland M. Frye, Felix E. Schelling Professor of English Literature, gave a lecture to the Lilly Fellows entitled, "Ways of Seeing, or Epistemology in the Arts: Unities and Disunities in Shakespearean Drama and Elizabethan Painting." A month later on June 5, he presented the same lecture in London to the Royal Society at its first joint meeting with the American Philosophical Society, one of the rare occasions in this century when a scholar of the humanities has been invited to speak to the Royal Society. The following are a few brief excerpts from that illustrated lecture.

"The way someone sees things," or "her point of view," or "his perspective"—these are all standard forms of speech, so necessary in the language that we would be hard pressed to communicate without them. "Seeing" has by metonymy come to denote far more than physical eyesight; it suggests virtually all of our perceptions as well as the ways in which we understand and organize those perceptions. . . .

We are left with the conclusion that the ways in which Shakespeare "saw things," his "point of view," his "perspective" was essentially the same, in structural terms, as that of the painters of late Tudor England. Both the dramatist and the Elizabethan painters (not one of whom was his artistic equal) operated with a flamboyant disregard for the visual and literary unities of time, place, and action which developed out of the Italian Renaissance. Instead, they chose the other ancient unities of persons and of narrative themes, diachronic rather than synchronic, representing many places in one picture, and providing multiple rather than single perspectives. Both carry us "here and there, jumping o'er times, Turning th' accomplishment of many years Into an hourglass." This aesthetic was provincially English and archaically Tudor even when Shakespeare began to implement it in his plays—it may indeed have been the principal thing about his art which was of his own age. But he turned it, as Ben Jonson well knew, into creations which are "not of an age, but for all time." In the select company of the most creative minds of our culture, Shakespeare was also distinguished by being, in some ways at least, a great artistic conservative. (See photographs on next page)



The set design of Inigo Jones for staging works by Ben Jonson draws a sharp contrast with the paintings of the Elizabethans and the plays of Shakespeare. Here Jones's sketches of St. George's portico for Jonson's *Prince Henry's Barriers* and the Roman atrium for Albion's *Triumph* demonstrate the new vision promoted by the Stuart dynasty. "As Ben Jonson's devotion to classical drama impelled him to insist upon the unities of time, place, action, so Inigo Jones's study of continental art compelled him to insist upon a unified total perspective for his scene paintings," explained Professor Frye.



In the Unton panel, the artist surrounds a portrait of soldier and diplomat Sir Henry Unton with images from the important moments in his life—his birth, education, travels, and death. "Like a Shakespeare play, the Unton panel turns the accomplishment of many years into an hourglass by leaping o'er times and places," said Professor Frye.

CONVERGENT THEMES IN TECHNOLOGY, MEDICINE AND SCIENCE

The seminar evaluations are glowing. The three seminar leaders have that pleased look which comes from doing successfully what they thought might be impossible. And the field of the History and Sociology of Science may never be the same.

"The opportunity to offer a Lilly seminar challenged us to combine our thinking about the history of science, technology, and medicine as a unity, which as far as we know no other history of science department in the country has done," explained Rosemary Stevens, chairman of the department and a specialist in the history of medicine and health policy.

To date the three subjects have grown up as very separate disciplines, each having their own society and journals. At most universities they are located in different schools. History of medicine, for example, may be part of the medical school; the history of technology may be included as part of the engineering school. And only the history of science would be in a setting similar to FAS.

"We've had this institutional opportunity, but we're so busy organizing seminars and teaching courses, that there wasn't really any occasion to sit down and really start knocking our heads together, forcing us to read stuff in the other people's fields," explained Mark Adams, an historian of science.

With the Lilly Program as their challenge, Professors Adams, Stevens, and Thomas Hughes, whose

field is the history of technology, met together, with more than a little skepticism, to discuss how they might organize a seminar. If they really wanted to integrate the fields, they would have to teach the seminar together, they reasoned, and would need to include material from each area in each session, rather than simply assigning one-third of the sessions to each scholar. They decided to begin their preparation by giving each other the most interesting and thoughtful 10 or 15 readings in each field.... And they continued to be skeptical.

"Going into that meeting, it still had to be proved to me that this sort of thing was possible, but when it turned out that we really had a lot more common ground than we thought we had, then it got very exciting!" said Professor Adams.

The exchange became even more productive when the two-week seminar program began in May.

"We then had the opportunity of exploring ideas with a phenomenal group of people," explained Rosemary Stevens. "They were self-confident and experienced and had very good senses of humor. There was a great deal of willingness to criticize and the maturity of experience to be able to criticize in a very constructive way... And they didn't let us get away with anything. Not much anyway."

The 25 faculty enrolled in the seminar came from Villanova, Glassboro, Temple, Cedar Crest, Medical College of Pennsylvania and other colleges, and their fields ranged from nursing to English, from history to biology.

Several themes which cut across the three fields of technology, medicine and science provided the focus for each session's discussion. For example, each of the three fields is strongly rooted in the institutions and systems of the times, such as professional organizations, factories, hospitals, research laboratories, government agencies, and universities. This provided the focus for a seminar entitled *Institutions and Systems*.

In another session, on *National and Regional Styles*, the seminar leaders and fellows discussed how technology, medicine, and science are defined by geography: while people view these fields as transnational, they actually develop in ways that are indigenous to their nation and region. Another theme, *Inertia*, dealt with the fact that science, technology, and medicine are not always in the vanguard, but often resist change due to pressures from such groups as government agencies, large corporations, and sometimes the professionals themselves.

The discussions were lively. The attendance was virtually 100 percent. And as many of the participants saw it, it was an unqualified success.

"All in all, it was one of the most congenial and effective groups of which I have ever been a part," said one participant. "Drs. Hughes, Stevens and Adams had the rare qualities of being good leaders as well as being 'good listeners' and chaired the seminar meetings with genuine respect for both subject and audience. The depth of the subject knowledge which they brought to the seminar was excelled only by their dynamic ability to communicate that knowledge to and to stimulate the group."

"The thematic approach and the selection of articles was effective. They somehow prevented the one-upmanship common among academics, and created an atmosphere that was, at once, pleasant and intense," commented another.

"They reinforced my conviction that knowledge is not easily divisible and in the process helped me replace cobwebs with firmer structures," said still another.

The program had an impact both at the schools of the Lilly Fellows and at Pennsylvania. A number of the participants used the course to help them prepare courses in history of science, technology, or medicine for their own students and drew on the seminar leaders for such practical information as course outlines and bibliographies.

Mark Adams is drawing on the Lilly experience in teaching an introductory course for graduate students that touches on all three fields. While he had taught the course the year before, he felt that there was simply not enough medicine and technology in it. This year's course, which is required of all graduate students, has incorporated several of the Lilly themes in addition to the perspective and enthusiasm that Professor Adams developed during the summer.

Rosemary Stevens sees the possibility of other forms of integration in the future. "It certainly expanded my horizons in terms of looking at conjunctions. There are interesting possibilities of doing a similar seminar perhaps with a clinical department."

Thomas Hughes, on leave this semester, took his Lilly lessons to the fall meeting of the Society for the History of Technology. He devoted part of his presidential address to a discussion of the convergent themes among the history of science, medicine, and technology.

MONASTERIES, MANUSCRIPTS AND OTHER THINGS MEDIEVAL

Just how many opportunities does a Medievalist get to converse over dinner about harlots in the *Gilgamesh* epic?

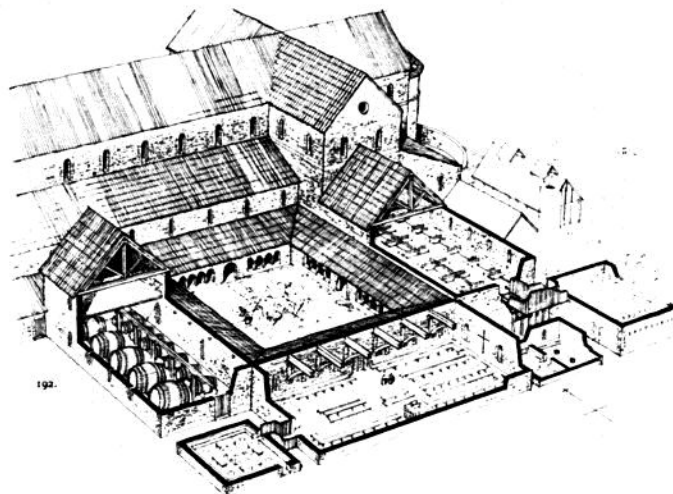
It can be lonely as the only medieval scholar at a rural campus like Lebanon Valley College or sometimes even in the French department at a large urban university like Temple. For its 25 fellows, the Lilly program has certainly offered a chance for both easy discussions on things Medieval and more scholarly considerations of topics like *Ruined Cities*, the Medieval Imagination and *Libri Feodorum*, Or Who Made a System of Feudal Relations?

The Medieval Studies program, now in its second year, was designed as interdisciplinary seminars for Delaware Valley Medievalists in fields ranging from theology to art history, from English to anthropology. Edward M. Peters, Henry C. Lea Associate Professor of Medieval History, planned the first year's six seminars around the theme of Town and Country in the Middle Ages and the second group, scheduled for the current academic year, on Literacy and Society.

Penn's unique strength in medieval archaeology was a key factor in the choice of Town and Country. University Museum Director Martin Biddle opened the program last year with a presentation on an archaeological approach to Anglo-Saxon medieval towns and fascinated participants by showing how much historical information can be reconstructed from the materials uncovered in excavations. Other highlights of the program included Berkeley Art Historian Walter Horn's presentation on the St. Gall Monastery plan, a large drawing on the back of a poem and the earliest plan ever discovered for a Medieval monastery. This lecture coincided with the appearance of Horn's book on the subject.

In the following weeks, presentations included Columbia's John H. Mundy, who spoke on Order and Social Class in Toulouse and the Toulousain, and Elizabeth A. R. Brown's work on Royal Authority in Town and Country in the Late Middle Ages. Diane Hughes explained in a paper titled *Ruined Cities* in the Medieval Imagination how people in the Middle Ages thought of places like the Roman Forum as ghostly and uninhabitable.

In the final sessions Edward Peters presented a paper sketching out urban and rural religion in which he was able to tie together many of the themes that had emerged throughout the year. He compared, for example, the great open spaces of city churches where the preacher's voice could be heard by all with the small pilgrimage-oriented churches in rural areas. He explained the differences among clergy and their training and asserted that the most advanced ideas



This cutaway perspective of the principal claustral structures and the monks' cloister is just one of the many beautiful illustrations which appear in The Plan of St. Gall, a book written by Ernest Born and Walter Horn. Horn discussed the plan at a session of the Lilly seminars on Town and Country in the Middle Ages.

came from the Franciscans and Dominicans who were only to be found in towns of over 3,000 people, while rural residents looked to more isolated village cures. Another theme was the church's images of the city: did the church view the city as a bastion of sin to be saved, or was the city the source of new ideas in religion?

The Lilly Fellows were encouraged to present their own papers, and during the last few sessions they spoke on topics ranging from Patterns of Town Government in Early 12th Century Leon-Castile to Hermitages in medieval Italy. The format also called for discussion in Saturday. The Saturday sessions began as rather polite question and answer periods and became considerably more lively as the weeks went on.

"It took several weekends for the group to gel, to really become friendly, and for the people from other colleges to know that this was for them. It wasn't for Penn. It wasn't for the guest speakers. It was for them," explained Professor Peters.

This year's seminars were launched with that understanding and proceeded very quickly to dinner conversations ranging from papal documents to techniques for presenting *The Canterbury Tales* to undergraduates.

Professor Peters chose Literacy and Society for the second year because as he put it, it was getting to be a

RECENT DEVELOPMENTS IN MATHEMATICAL MODELING EXPLORED

Francis E. Johnston uses mathematical equations to study why children grow differently. Abraham Noordergraaf creates mathematical models to study the heart. And Lawrence R. Klein won a Nobel Prize for developing complex models of the economy.

"Because mathematics is an interdisciplinary field which can be applied to many scientific activities, it plays an increasingly important role in solving real world problems as they occur in a number of areas," explains George Karreman, the person who organized the Lilly-Pennsylvania seminars in mathematical modeling. He points out that many fields, such as biology, engineering, economics, history and medicine, require the solution of complex system problems containing a hierarchy of several interacting subsystems. "With recent advances in mathematics several phenomena which could not be described adequately by calculus can now be treated mathematically."

Dr. Karreman, a professor of physiology and a mathematical biologist, developed the mathematical modeling seminars in response to a suggestion for such a program by Lilly-Pennsylvania Advisory committee members from other colleges and universities. There are four seminar series: in the fall there were programs in the social sciences and in the biological sciences; this spring there will be programs in the biological sciences and science and engineering. The programs have drawn together engineers and physicists, chemists and mathematicians, historians and operations research specialists and are designed to give participants an overview of recent developments in mathematical modeling.

Take, for example, Francis Johnston's work with child growth and development. This anthropologist explained to Lilly Fellows how he has used models to identify a population for study and to describe childhood and adolescent growth, focusing on factors such as nutrition and environment which affect that growth.

A fairly simple model was used to identify malnourished children from a Mexican community, who were then compared with normal children to identify the factors that are connected to malnutrition.

The model permitted Johnston to compare each child's growth rates against a norm. In this way he was able to spot malnourished children since their growth rates were consistently falling behind the norm. Without the mathematical model it would have been almost impossible to tell whether poor growth was caused by such factors as a period of illness or other problems that were not related to the process of growth itself.

hot topic in the field.

"Because of the anthropologists' work, medieval historians and literary people are beginning to apply anthropological approaches to their own texts," Professor Peters explained. "Suddenly we find that the old distinctions between literate clergy and illiterate laity simply don't mean anything anymore."

To begin the year, Brian Stock was invited from Toronto to deliver a paper identifying some of the issues in literacy. Donald Bullough of the University of St. Andrews in Scotland presented his work on Women and Literacy in which he demonstrated that both religious and lay women were often literate in the Middle Ages and may well have prepared some of the manuscripts that were attributed to men.

The next weekend included Edward B. Irving, Jr. of Penn's English department who spoke on Literacy in Anglo-Saxon England and Margaret Aston, who discussed Devotional Literacy in the Fourteenth to Fifteenth Centuries. In the four sessions that will follow, eight speakers will discuss topics ranging from Attitudes Toward Literacy, Learning, and Letters in Medieval Literature to Political Images in Works of Art: On the Iconography of the German Monarchs.

Probably the most universal reaction of the participants is that they have had a chance to come together to talk and learn from each other. Some are now getting together informally outside the seminar to discuss mutual interests. Others have returned to research after many years away from it.

"This program is one that does something that this university has professed itself to be trying to do for a long time," said Professor Peters. "It really does make Penn a regional center."



Dr. Edward B. Irving, Jr. (left), Professor of English at Pennsylvania, discusses his Lilly seminar lecture on Literacy in Anglo-Saxon England with Dr. Tom Waldman (center), Associate Director of the Lilly Program at Pennsylvania, and Dr. Edward M. Peters (right), Henry C. Lea Associate Professor of Medieval Studies, who planned the Lilly seminars in Medieval Studies.

Professor Johnston has also created a far more complex model to describe childhood and adolescent growth and developed an equation, long sought for by students of growth, to predict size at a given age.

Johnston has used the data from this model to compare the growth of children from various backgrounds, such as United States residents, Guatemala natives and Guatemalan residents of European or North American ancestry, to see whether environmental factors were more important than genetic factors in determining growth. It was concluded that adolescent growth follows genetics while childhood growth is influenced by environmental factors.

Johnston is just one of the seminar leaders in the mathematical modeling programs. Others have included Dr. Lawrence Klein, Benjamin Franklin Professor of Economics, who explained to the Lilly Fellows how econometric models are used to analyze such contemporary problems of the economy as energy pricing, food supply and stagflation, and Dr. Abraham Noordergraaf, a biophysicist working in the Bioengineering program in the School of Engineering and Applied Science, who described theoretical and experimental work being undertaken on the cardiovascular system.

As noted by Professor Noordergraaf, investigators attempting to assess the quality of the heart as a pump formerly had to rely upon indirect evidence, such as arterial pressure pulse. Efforts to interpret this pulse generated conflicting views and it wasn't until a general mathematical theory of pulse wave propagation in arteries was developed—in large part by Noordergraaf and his collaborators—that it became possible to define, in detail, the load faced by the heart as it pumps.

Dr. Noordergraaf pointed out that since the development of the theory, a wide variety of measurement techniques have been developed. Some of these permit direct observation of the heart *in vivo*, and, in turn, they have been used to postulate an array of indices of "contractility" for the heart. Noordergraaf has developed what is called the "pump equation" which attempts to describe ventricular pumping; this equation, when fully developed, is expected to provide the logical basis for the derivation of a measure of "contractility" to replace the currently popular but so far unsuccessful intuitive procedure.

Ted Hershberg, Associate Professor in the School of Public and Urban Policy, talked about multidisciplinary urban research which relies heavily on computer

technology. As he noted, "The construction of a massive machine-readable data base which can describe population, history, transportation, infrastructure, vital statistics, institutions and services has made it possible for scholars from the major social science disciplines, including sociology, economics, geography, demography, city planning and history, to approach research on an integrated basis."

Citing work undertaken in the Philadelphia Social History Project on urban-industrial development in Philadelphia, Hershberg demonstrated how this data base could be used to explain the low socioeconomic condition of black Americans. The experience of black Philadelphians was compared to that of earlier waves of white immigrants, the role of racial discrimination in the city's history was discussed, and the importance of understanding the changing nature of Philadelphia's structure of opportunities was established.

Other topics presented this fall have focused on scientific modeling, mathematical requirements for the analysis of historical data, bifurcation and catastrophe theory in science, population systems dynamics, synergetics and cyclic behavior, and seminars leaders have included Professor James Bennett (Peace Science), Zoltan Domotor (Philosophy), Kenneth Fegley (Systems Engineering), Christopher Hamlin (Anthropology), Stuart Kauffman (Biochemistry and Biophysics) as well as Professors Hershberg, Johnston, Karreman, Klein and Noordergraaf.

After each seminar, the participants have dined together and this has given them an opportunity to meet and discuss applied mathematics with other people in the field. As Professor Johnston put it, "It has allowed us to share some of the things we at Penn have been doing with other people in the area, and it's good because we get feedback from them. I think I learned almost as much as they learned."

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